INDIA RUBBER WORLD

OUR 64th YEAR

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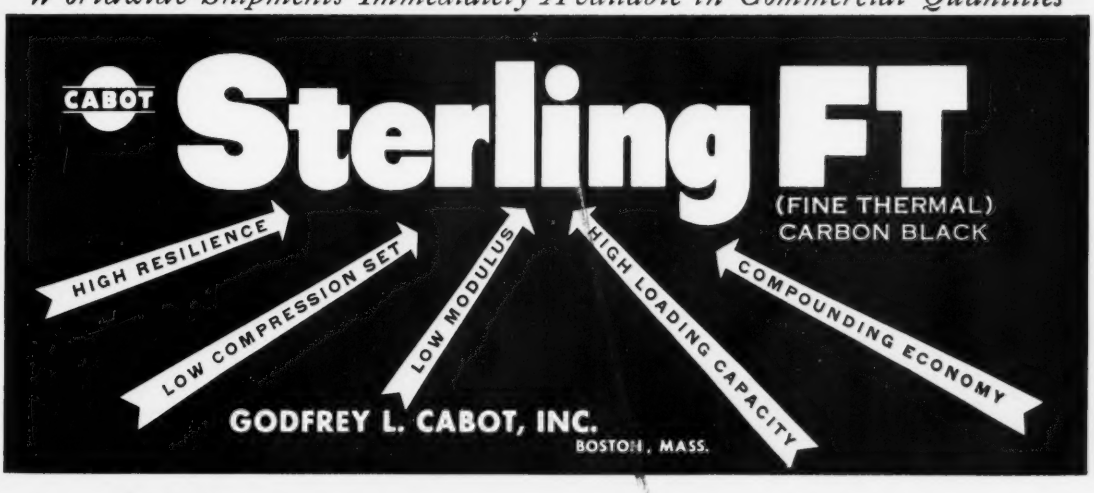

IMPROVE PROCESSABILITY!

REDUCE BREAKDOWN TIME!

CUT POWER CONSUMPTION!

Ask your Du Pont technical sales representative for his help in solving your processing problems. He's part of a team of specialists that's hard to beat. Working with him on customer service is an experienced staff of rubber chemists and engineers . . . backed by Du Pont's outstanding research facilities.

Use these Du Pont RPA

peptizing agents

RPA NO. 2 — **Solid Form — For natural rubber and GR-S**

Supplied in the form of waxy flakes, RPA No. 2 is especially suited to open-mill breakdown of natural rubber. Its use materially reduces the time and power required for breakdown. From 0.15 to 0.60 part per 100 parts of rubber is recommended, depending on the time and temperature of milling.

RPA NO. 3 — **Liquid Form — For natural rubber, GR-S, and reclaim**

Because of its liquid form, RPA No. 3 is preferred for peptizing natural rubber in a Banbury or a plasticator. With this peptizer, it is often possible to eliminate the second pass usually required when plasticating by mechanical means alone. The recommended amounts are the same as for RPA No. 2. It also helps produce smooth-processing reclaim stocks and aids in reducing the viscosity of rubber cements.

In both "cold" and "oil-extended" GR-S, RPA No. 3 markedly improves processability . . . results in lower processing temperatures, less scorching, smoother extrusions. Concentrations of 1.0 part or more are generally recommended.

RPA NO. 3 Concentrated — **Liquid Form — For natural rubber, GR-S, and reclaim**

RPA No. 3 Concentrated is recommended for use in the following amounts: 0.05 to 0.30 parts for natural rubber, 0.10 to 0.50 parts for GR-S, and 0.50 to 1.0 parts for low-temperature GR-S.

RPA NO. 5 — **Liquid Form — For GR-S and GR-S reclaim**

An excellent peptizer for "hot" GR-S, RPA No. 5 effectively reduces breakdown time and power consumption . . . helps produce smoother processing stocks with reduced nerve and shrinkage. From 0.25 to 1.0 per cent RPA No. 5 is recommended for breakdown at high temperatures on a mill, or in a Banbury or plasticator.

Reference Literature: Report No. 50-5, "The RPA's," and Report No. BL-248, "RPA No. 3 in Oil-Extended GR-S Type Copolymers."

WRITE OR PHONE OUR NEAREST DISTRICT OFFICE FOR FURTHER INFORMATION.

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BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

Indid Rubber World, September, 1953, Vol. 128, No. 6. Published monthly by Bill Brothers Publishing Corp. Office of Publication, 1309 Noble Street, Philadelphia, Pa., with Editorial and Executive Offices at 386 Fourth Avenue, New York 16, N. Y., U.S.A. Entered as Second Class Matter at the Post Office at Philadelphia, Pa., under the act of March 3, 1879. Subscription United States and Mexico, $5.00 per year; Canada $6.00; All other Countries $7.00; Single Copies 50 cents. Address Mail to N. Y. Office.

News about

B. F. Goodrich Chemical *raw materials*

INTRODUCED only a year ago, low-temperature polymerized Hycar 1042 has become the standard for tough applications.

Hycar 1042 has the same high resistance to oil and age as Hycar 1002 and 1012. In addition, it provides higher tensile strength and increased elongation—gives that extra margin of safety so important to meet tough specifications.

Check these advantages—see how they can help your operations:

Higher tensile strength
Greater elongation
Improved milling
Smoother extruding and calendering
Better solubility for cements
Outstanding oil and age resistance

For information and technical advice about "Cold" Hycar 1042, please write Dept. HA-9, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

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What's cooking? No matter what rubber product you manufacture, there's a Philblack that's just your dish!

Philblack A . . . a real treat for rubber molders! Easy-processing MAF black turns out accurate moldings, smooth tubings. Preserves pliancy. Disperses heat.

Philblack O . . . an HAF black for tough jobs. In tire treads it guards against abrasion and cut-and-crack growth. Reduces static electricity.

Philblack I . . . the new ISAF black (Intermediate Super Abrasion Furnace) that's ready to deliver *unusually high abrasion qualities* at a price that keeps your products *competitive*.

Philblack E . . . SAF black for *mileage miracles!* The top in Super Abrasion Furnace Black. Tire treads made with Philblack E wear up to 42% longer!

To find out which Philblack can do the best job for you, consult your technical sales representative or write our Akron Laboratory. Order Philblacks in carload or truckload lots.

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Aged 7 weeks at 212°F, a sample 1" wide strip of frictioned cotton fabric *without* Aranox failed with no pull at all, while a similar strip *with* Aranox withstood a pull of 92 lbs. per inch!

Aranox also gives excellent protection with minimum discoloration in natural rubber stocks for white or light-colored molded goods and sundries. And it protects against copper and other pro-oxidant metals—especially important in a wire insulation compound.

It is especially recommended for Neoprene coatings, high temperature wire insulation, air cured sheeting, and sulfur chloride cured stocks.

A gray powder in form, Aranox has good storage stability, requires no handling precautions, and disperses readily. Find out more about Aranox® by sending the coupon below today.

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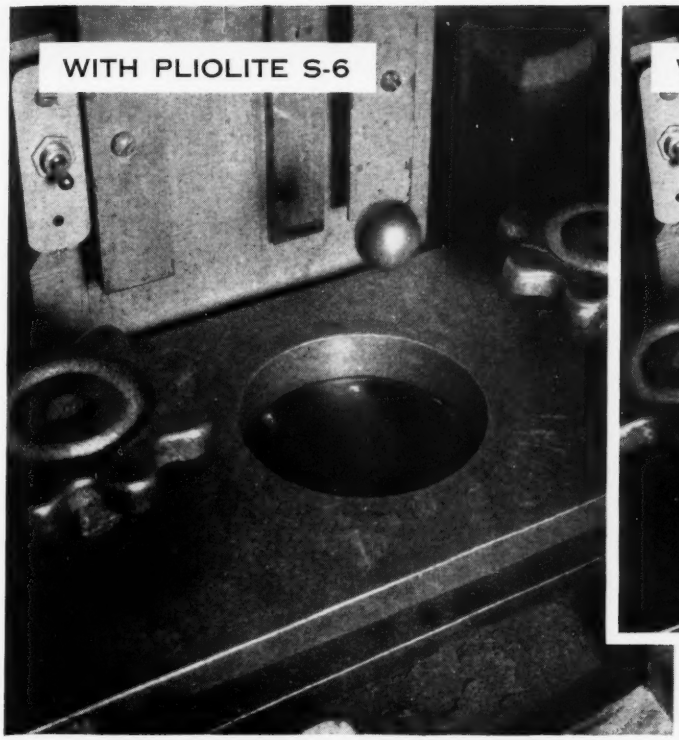

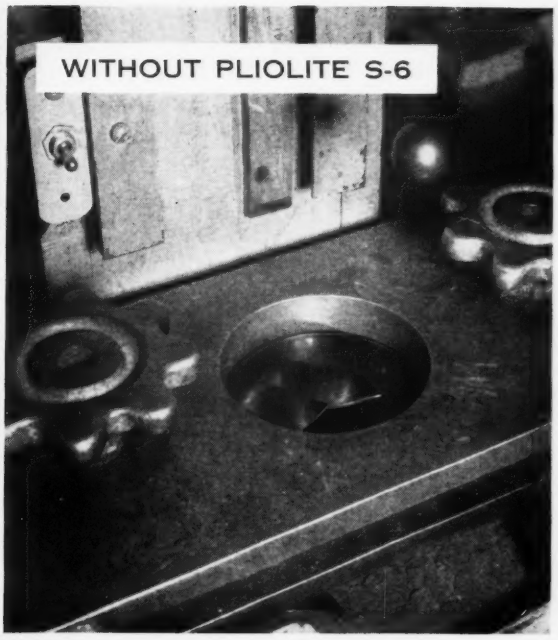

FALLING BALL TESTS PROVE greater impact resistance of hard rubber made with PLIOLITE S-6. Samples were photographed immediately after being struck with 0.7" dia. steel ball weighing 67 grams and dropped from height of 5½ feet

TOUGHER HARD RUBBER

is easier made with PLIOLITE S-6

Hard rubber manufacturers always have been hard put to overcome an inherent limitation of their product—low impact resistance. They also have been plagued with difficult processing and generation of heat in the curing of high sulfur stocks.

Answers to all three of these problems are now at hand through the use of PLIOLITE S-6 – Goodyear's rubber reinforcing, high styrene copolymer. Recent studies and tests have proved that incorporation of PLIOLITE S-6 in hard rubber gives these improvements:

1. Much higher impact strength, depending upon the amounts of resin and sulfur used.
2. Use of lower sulfur levels without reduction in hardness, stiffness, tensile strength or softening point.
3. Safer production through control of the exothermic curing reaction plus permitted use of thicker sections and faster cures.
4. Easier production through nerve reduction and stiffening of the stock to give better handling, milling and preforming properties.
5. Better appearance of the cured stock surface.

For further details on how to produce tougher hard rubber easier with PLIOLITE S-6, write to:

Goodyear, Chemical Division, Akron 16, Ohio

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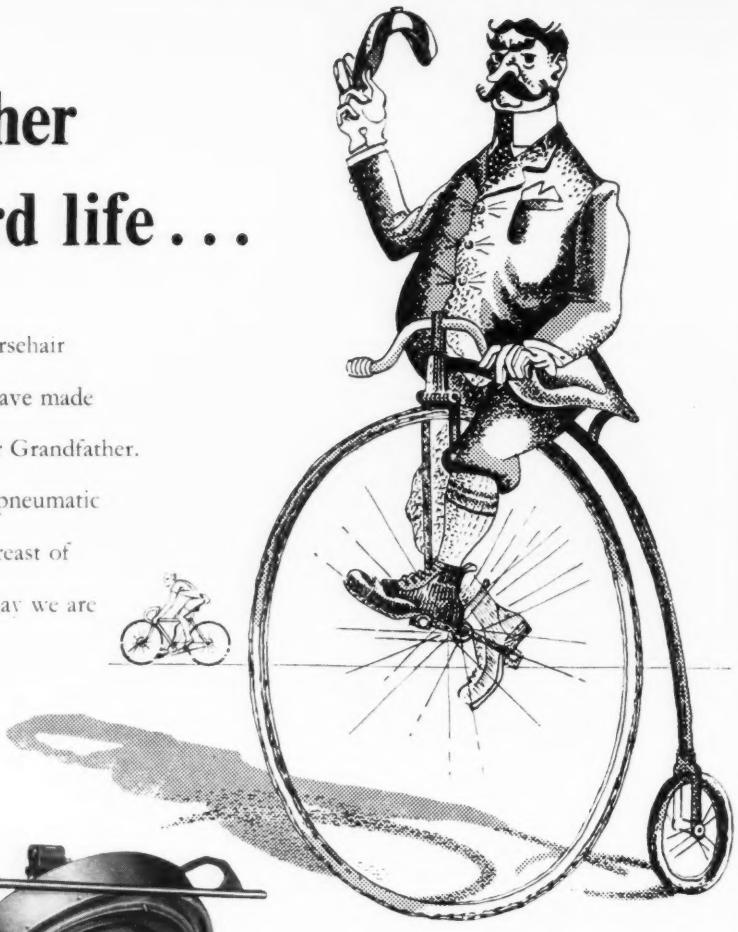
Grandfather had a hard life...

Cycle tyres stuffed with horsehair and cobbled streets must have made life a bit uncomfortable for Grandfather. Since the introduction of pneumatic tyres, we have kept full abreast of every development and today we are the leading manufacturers of cycle tyre producing equipment in the World.



SHAW

machinery for tyre and tube production

Shaw-McNeil 40-34-3¾ Twin Bag-o-matic Curing Press for Cycle Tyres Supplied complete with motor and controller, time cycle controller—ready for connection to service lines.

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2854

A PRETTY PICTURE – this flooring profitably produced with PLIOVIC. Its colors are bright and clean. It is easily installed and maintained. It fully resists the effects of light, age, hard wear, oils, greases and water.

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HERE is top-quality vinyl flooring. Here is a highly salable product you can produce–easily and economically–consistently and profitably–with PLIOVIC, Goodyear's polyvinyl chloride resin.

PLIOVIC is so polymerized as to process easily, yet give excellent physical properties in the finished product. Its high bulk density means easier handling and full production on standard equipment. Its rapid fluxing means fast production. Its unusual heat resistance means safe color development and rerunning of scrap. Its controlled uniformity means smooth, continuous production with fewer rejects.

Get more out of your plant by putting PLIOVIC in. Get full information and technical assistance on flooring–or sheeting, film, extruded and molded goods – profitably produced with PLIOVIC, by writing to:

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ACTIVATOR NEWS

A supplement to THE ACTIVATOR—the house organ issued by The New Jersey Zinc Company for over 15 years to aid the Rubber Industry in its use of Zinc Oxide.

PROPIONATE COATING ADDS NOVEL FEATURES TO ZINC OXIDE

Rubber compounders and production men alike, in recent years, have helped to write a new chapter in the book of zinc oxide knowledge. For they have found, as they increased their use of zinc propionate coated zinc oxide, that this pigment—Protox-166*—has some advantages not available in untreated oxide.

Several of those features of Protox-166 have been described in detail in previous issues of ACTIVATOR NEWS, and others will appear here later. For your convenience, the list of such properties is shown in the attached table. If you have not yet evaluated Protox-166 in your compounds, we shall be glad to send you samples.

PROTOX-166 GIVES YOU ALL THESE ADVANTAGES

(COMPARED WITH ZINC OXIDES NOT OF THE PROTOX TYPE)

FEATURES OF PROTOX-166	HOW YOU PROFIT
LOWER DRY BULKING	LESS STORAGE SPACE LARGER BATCHES MORE OUTPUT
LOWER MOISTURE PICKUP	FASTER MIXING
ORGANOPHILIC COATING	QUICKER INCORPORATION BETTER DISPERSION LOWER POWER CONSUMPTION EVEN ACTIVATING AMOUNTS SPEED MIXING OF CARBON BLACKS
SCORCH INHIBITION	MORE PRODUCTION
PLASTICIZING EFFECT	FASTER, SMOOTHER TUBING AND CALENDERING REDUCES DIE SWELL CUTS CALENDER SHRINKAGE GIVES COOLER-RUNNING STOCKS
HIGHER REINFORCEMENT	IMPROVED TENSILES BETTER TEAR RESISTANCE HIGHER MODULUS GREATER RESILIENCE
MINIMUM PROGRESSIVE CURE, EVEN WITH PERSISTENT ACCELERATORS	LONGER SERVICE LIFE

**U. S. Patents 2,303,329 and 2,303,330*

THE NEW JERSEY ZINC COMPANY

Producers of Horse Head Zinc Pigments

... most used by rubber manufacturers since 1852

160 Front Street, New York 38, N. Y.

HAT

HAT *Design* EXTRUDER STOCK SCREWS DO YOU NEED?

HALE AND KULLGREN CUT 'EM TO YOUR SPECS

● These Stock Screws represent a few of the many designs available through Hale & Kullgren. We cut our own out of solid forgings on a machine tool of our own design. You specify the design you need and we will deliver. We cut all sizes and types . . . to fit the specific extruder or the specific raw material or both. Prompt attention to your inquiry.

● The combination of Hale and Kullgren and The Aetna-Standard Engineering Company offers a complete service to the rubber and plastics industry. Whether you need stock screws, an extruder, a processing line or a complete plant, we can deliver.

COMPLETE SERVICE ON RUBBER & PLASTICS
a complete plant: a specialized process: an engineering service or individual machines

ational Erie products for the Plastic and Rubber Industries
xtruders • Simplex Doors for Autoclaves • Mills and Hy-
ulic Presses.
his old and well-known line of machinery was acquired
rch 1, 1952, by The Aetna-Standard Engineering Company.
y are manufactured in their Warren, Ohio, and Ellwood
, Pa., plants. The sales and engineering of the National Erie
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Improved **HARFLEX 500®**

will make your product

STAND OUT

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BETTER LOW TEMPERATURE FLEXIBILITY

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Inquiries for our *improved* HARFLEX 500® are invited. Our technical staff is at your disposal.

BINNEY & SMITH CO. • Distributor to the Rubber Industry

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A century of service to the rubber industry has given Farrel an unusual understanding of its requirements. This is important to you, because it means that through the experience gained, Farrel is equipped to supply you with rolls that will fit your needs precisely.

Experience is the only answer to many of the problems that arise. It is of vital importance in determining the design of a roll with regard to proper depth of chill for a given purpose, or the correct metal mixture to be used . . . in deciding the engineering of a roll for proper temperature control . . . in figuring the amount and degree of crown . . . or in designing the corrugations for washer or cracker rolls.

Farrel rolls are produced in the world's largest specialty roll shop at Ansonia — a shop equipped to make rolls of any size required, and in many different metal formulas, of chilled iron, alloy iron, gray iron, Meehanite® metal, or steel. Here each step in manufacturing is closely controlled, from metallurgical analysis of raw materials to final inspection.

When you need roll renewals or other processing equipment, call Farrel.

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F-B PRODUCTION UNITS

Banbury Mixers • Plasticators • Pelletizers • Extruders • Calenders • Mixing, Grinding, Warming and Sheeting Mills • Refiners • Crackers • Washers • Hose Machines • Bale Cutters • Hydraulic Presses and Other Equipment for Processing Rubber and Plastic Materials.

FB-855

Need more protection?

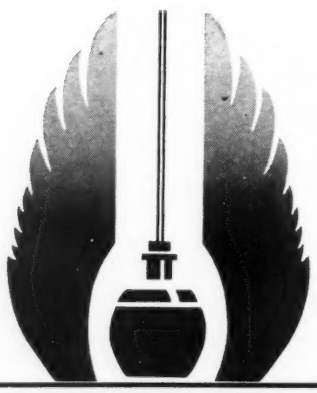
STABILITE*

THE ANTIOXIDANT WITH UNIQUE CHARACTERISTICS

When looking for the most economical and outstanding antioxidant for both natural and synthetic rubber, consider STABILITE, which has, combined in one material, the following characteristics:

1. *Protection against oxidation and heat, sunchecking and mechanical flexing.*
2. *Distinct softening effect on uncured rubber or GR-S, resulting in better processing and dispersion, smoother calendering and tubing and at the same time without effect on modulus at cure.*
3. *The unique property of increasing the effect of most commercial antioxidants when used in conjunction with* STABILITE. *The effect of such mixtures is greater than the components.*

For the protection of your rubber products use STABILITE; for maximum resistance to oxidation, heat, sunchecking and mechanical flexing replace part of your present antioxidant with STABILITE.



The C. P. Hall Co.
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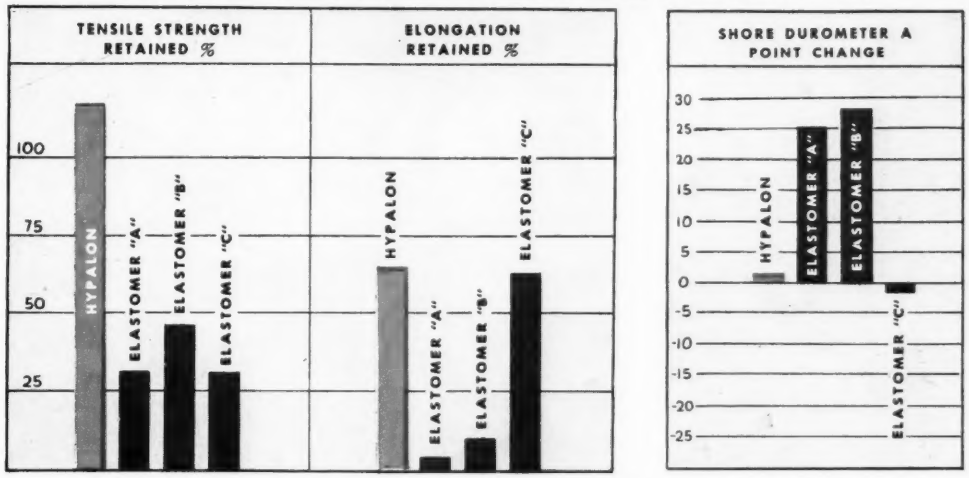
HEAT AGING TESTS SHOW

HEAT AGING CHARACTERISTICS OF ELASTOMERS, 14 DAYS AT 257°F.



Heat aging tests were conducted in circulating air ovens to determine any changes in three important properties: tensile strength, elongation, and Shore durometer hardness.

DU PONT HYPALON*

CHLOROSULFONATED POLYETHYLENE

gives superior high-temperature service

The resistance of Du Pont "Hypalon" chlorosulfonated polyethylene to degradation from heat suggests a wide variety of uses in the rubber industry —for "Hypalon" alone, as well as in blends with other elastomers. Steam hose covers, for example, require the ability to stand up through long service at high temperatures. Many other uses are indicated by this property of Du Pont "Hypalon." Among them are included spark-plug boots, gaskets, O-rings, electrical insulation and jacketing, diaphragms, conveyor belt covers and molding forms and bags.

And heat resistance is only one of a unique combination of properties "Hypalon" offers. These properties point to such varied uses as automobile-tire sidewalls, automotive weather stripping, coated fabrics, footwear, floor coverings, linings for chemical handling equipment and acid hose.

Perhaps Du Pont "Hypalon"—or a blend including "Hypalon"—can help you develop a new or improved product. "Hypalon" is now available in limited commercial quantities.

ONLY "HYPALON" OFFERS *ALL* THESE OUTSTANDING PROPERTIES

- **COMPLETE OZONE RESISTANCE**
- **EXCELLENT ABRASION RESISTANCE**
- **EXCELLENT WEATHER RESISTANCE**
- **GOOD HEAT RESISTANCE** — Suitable for continuous service up to 250 F. and intermittent service at higher temperatures.
- **EXCELLENT CHEMICAL RESISTANCE**
- **UNLIMITED COLOR POSSIBILITIES.** Does not require carbon black to achieve maximum physical properties.
- **EXCELLENT FLEX LIFE**

*REG. U.S. PAT. OFF.

FOR FURTHER INFORMATION: Send today for technical literature on the properties, applications and compounding of Du Pont "Hypalon." Or, if you prefer, a Du Pont technical representative will call at your convenience.

E. I. du Pont de Nemours & Co. (Inc.)
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I am interested in "Hypalon" for _____. Please ( ) send me literature. ( ) Have your technical representative call.

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. . . THROUGH CHEMISTRY
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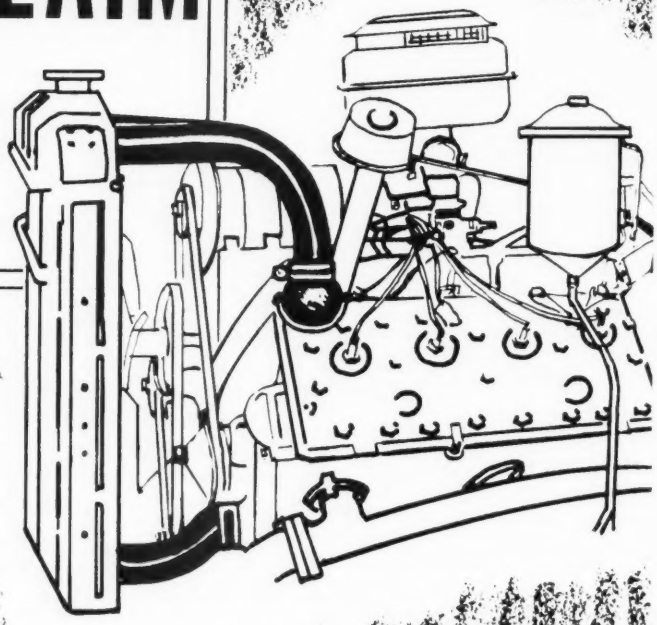
Pequanoc BUTYL RECLAIM #5950



- Fast Mixing
- Smooth Extruding
- Tight Cure

FOR BUTYL RADIATOR HOSE

PEQUANOC 5950 BUTYL RECLAIM	64.7
FEF BLACK	15.5
HARD CLAY	9.7
ZINC OXIDE	1.9
STEARIC ACID	.8
PETROLATUM	2.7
PARAFFIN	2.7
SULFUR	1.2
TETRAMETHYL THIURAM DISULFIDE	.4
SANTOCURE	.4
	100.0

Press Cure 20 Min. @	320°F
Tensile	925
Elong.	425%
Duro "A"	75
Est. Lb. Cost	$.110
Sp. Gr.	1.34
Vol. Cost	.1474

Pequanoc Rubber Co.

MANUFACTURERS OF RECLAIMED RUBBER

MAIN SALES OFFICE and FACTORY: BUTLER, N. J.

A GOOD FAMILY TO KNOW BETTER for Economy Reasons

PICCO RESINS

FOR EVERY PURPOSE in Various Melting Points

PICCOUMARON

PARA COUMARONE INDENES

Neutral, inert synthetic resins that promote good aging, good flexing, high tear resistance to rubber products. They impart tack and good flow to calendered or extruded compounds. Supplied in wide range of melting points — liquid, semi-solid and solid forms, and in colors from light through medium, reddish to dark.

PICCOLYTE

PURE HYDROCARBON TERPENES

Thermoplastic synthetic resins having the same carbon to hydrogen ratio as plantation rubber. Readily soluble in low-cost naphthas, pentane and hexane. Pale and stable in color, chemically inert and compatible with many materials. Non-toxic and available in a wide range of melting points.

PICCOLASTIC

STYRENE and MODIFIED STYRENES

Thermoplastic, light colored synthetic resins completely soluble in aromatic hydrocarbons. They possess excellent heat stability and are not subject to change by oxidation and are acid and alkali resistant to a high degree. Available in consistencies varying from liquids to high melting point brittles.

PICCOPALE

A NEW BASIC RAW MATERIAL

Low cost thermoplastic synthetic resins that can serve as a basic raw material for many applications. Pale and stable in color, compatible with many materials. Readily soluble in low-cost naphthas, pentane and hexane and available in a range of melting points.

Write for complete technical data on these resins.

HARWICK STANDARD CHEMICAL CO.

AKRON, BOSTON, TRENTON, CHICAGO, LOS ANGELES

NEW Scott Aluminum Block Heating Bath

For Temperature Ageing Tests of organic materials, particularly elastomers

Also for OXYGEN AGEING STUDIES

Temperatures up to 450°F
Individual Compartments

Here is an insulated solid aluminum block oven, developed originally for oxygen absorption studies, now produced as a standard Scott Testers* model available also for oven ageing studies of rubber, silicones and other elastomeric materials. With built-in electric heating elements and temperature controls it eliminates the hazards of heating with immersions oils and is also much cleaner, while the individual isolated compartments eliminate errors due to contamination between samples. Made in 2 standard arrangements: 28 compartments approximately 1½" dia. for temperature ageing; also with a lesser number of larger compartments for oxygen ageing. Can also be furnished in other compartment arrangements if your particular needs require it.

Request Literature

SCOTT TESTERS, INC. 90 BLACKSTONE ST., PROVIDENCE, R. I.

*Registered Trademark

Scott Testers — Standard of the World

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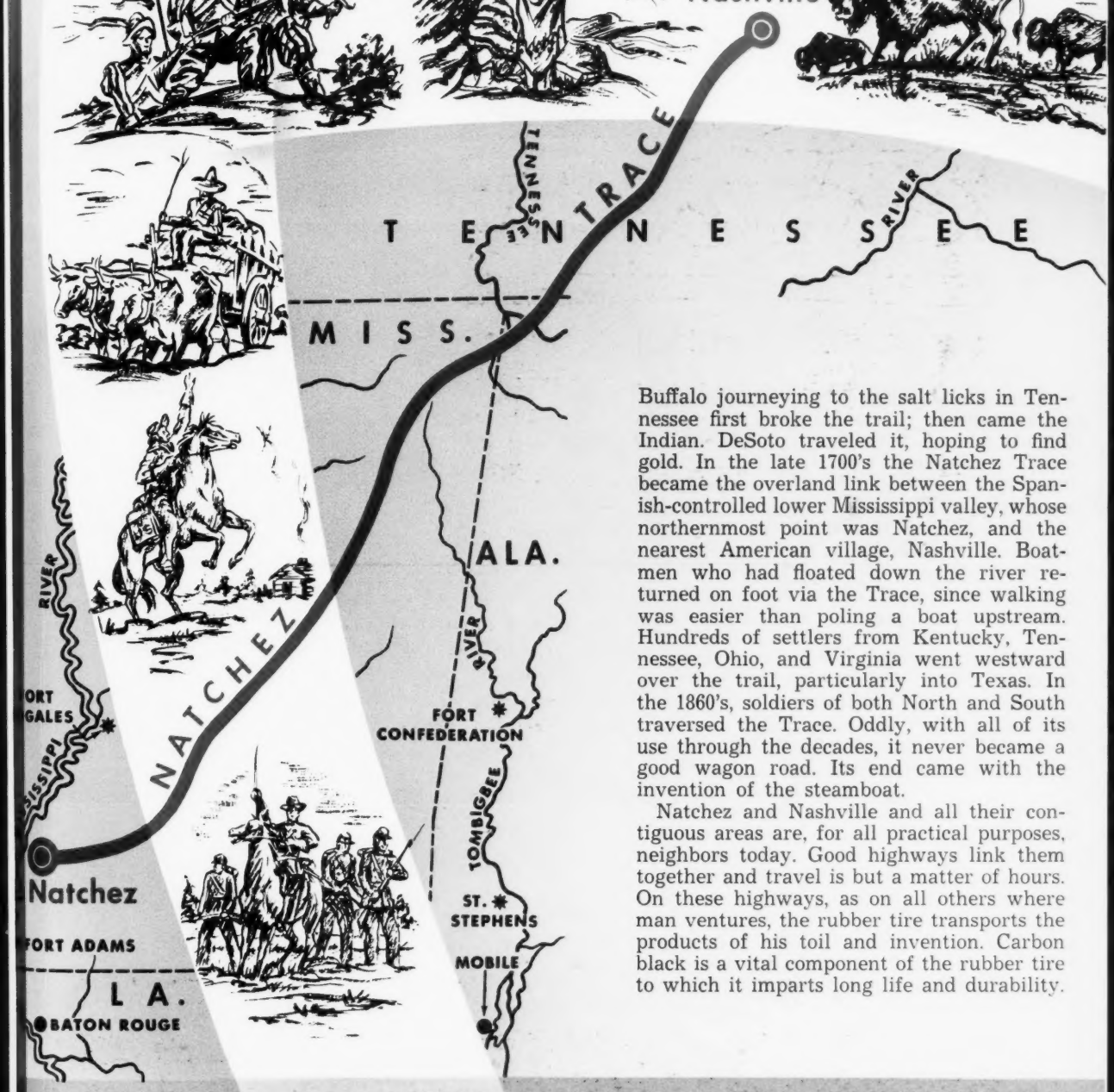
the NATCHEZ TRACE



Buffalo journeying to the salt licks in Tennessee first broke the trail; then came the Indian. DeSoto traveled it, hoping to find gold. In the late 1700's the Natchez Trace became the overland link between the Spanish-controlled lower Mississippi valley, whose northernmost point was Natchez, and the nearest American village, Nashville. Boatmen who had floated down the river returned on foot via the Trace, since walking was easier than poling a boat upstream. Hundreds of settlers from Kentucky, Tennessee, Ohio, and Virginia went westward over the trail, particularly into Texas. In the 1860's, soldiers of both North and South traversed the Trace. Oddly, with all of its use through the decades, it never became a good wagon road. Its end came with the invention of the steamboat.

Natchez and Nashville and all their contiguous areas are, for all practical purposes, neighbors today. Good highways link them together and travel is but a matter of hours. On these highways, as on all others where man ventures, the rubber tire transports the products of his toil and invention. Carbon black is a vital component of the rubber tire to which it imparts long life and durability.

UNITED CARBON COMPANY, INC.

Kosmos 40, a high modulus gas base furnace black (HMF), has a long-established record for uniformity, easy mixing, good tubing, freedom from scorch, and a balanced reinforcement that assures high resiliency, low hysteresis, and good resistance to tear and flex.

For quieter-riding tire treads use some Kosmos 40 — plus, of course, United's high reinforcing blacks.

UNITED CARBON COMPANY, INC.

CHARLESTON 27, WEST VIRGINIA

NEW YORK AKRON CHICAGO BOSTON MEMPHIS

You Will Want THIS BOOK

Multiple Opening
This picture is typical of multiple opening platen type presses of strain plate construction. This particular press is intended for curing rubber molded products but similar presses are used for press polishing and many like applications. The strain plates are preferred for some work because they provide greater rigidity than strain rods and prevent radiation and heat loss from steam-heated platens. A variety of accessories are available for spacing the platens, opening them, and connecting them to the steam supply. Various elevator arrangements can also be supplied for rapid loading and unloading.
STRAIN PLATE TYPE
PLATEN PRESSES
A 2200-ton eight-opening molding press with heated platens 60" square. The method of connecting the platens to the steam and exhaust manifolds is one of a number of designs that are available.
STRAIN ROD TYPE
ERIE
FOUNDRY CO.,
ERIE, PA., U.S.A.
Bulletin No. 350
HYDRAULIC PRESSES

Erie Foundry
HYDRAULIC PRESSES

For Rubber Working
Multiple Opening Platen
Self-Contained Forming
Mechanical Goods Presses
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Write for Your Copy of Bulletin 350

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Experiments sometimes cause trouble...

Skellysolve for Rubber and Related Industries

Applications

SKELLYSOLVE B. For making quick-setting cements for the shoe, tape, container, tire and other industries. Quick-drying, with no foreign taste or odor in dried compound.

SKELLYSOLVE C. For making quick-setting cements with a somewhat slower drying rate than those compounded with Skellysolve B.

SKELLYSOLVE D. For cements and variety of manufacturing operations. Good odor. Quick drying. Minimum of heavy, greasy compounds.

SKELLYSOLVE H. For general use in manufacturing operations and cements, where faster evaporation rate than that of Skellysolve D is desired.

SKELLYSOLVE E. For use wherever a relatively slow drying solvent is desired.

SKELLYSOLVE R. For general use in tire building and a variety of other manufacturing operations and cements. Reduces evaporation losses. Medium quick final dry. Lessens bloating and skinning tendency.

"DOC" MacGEE SAYS: Why risk unnecessary experiments by trying out something "just as good as" Skellysolve. You take no chances with the quality of your product or of balling up your plant operations when you standardize on Skellysolve—a fact that's been proved over and over again for more than 20 years.

First of all, Skellysolve is noted for its uniformity. Every batch has the same over-all properties to protect your *product's* high quality . . . to fortify its sales appeal, as well as to give trouble-free operations in your plant. Skellysolve's uniformity is assured by strict laboratory controls, unsurpassed manufacturing methods, and the "will to do" that stems from pioneering and major product operations. Skellysolve is not a "side-line" venture.

Test Skellysolve for every feature that is important to you. Check its low end point, quick evaporation, low vapor pressure, its minimum of unsaturates and pyrogenic decomposition products.

See why Skellysolve's minimum of low and high boiling compounds means reduced rejects due to blushing and blisters. Note the controlled vapor pressure to guard against bloated containers. What's more, the minimum of low boiling compounds means no "seeds" in rubber cements . . . with high bonding strength assured by freedom from greasy residues.

For more complete technical facts, write now. And ask about special help on solvent applications from the Skellysolve Technical Fieldman.

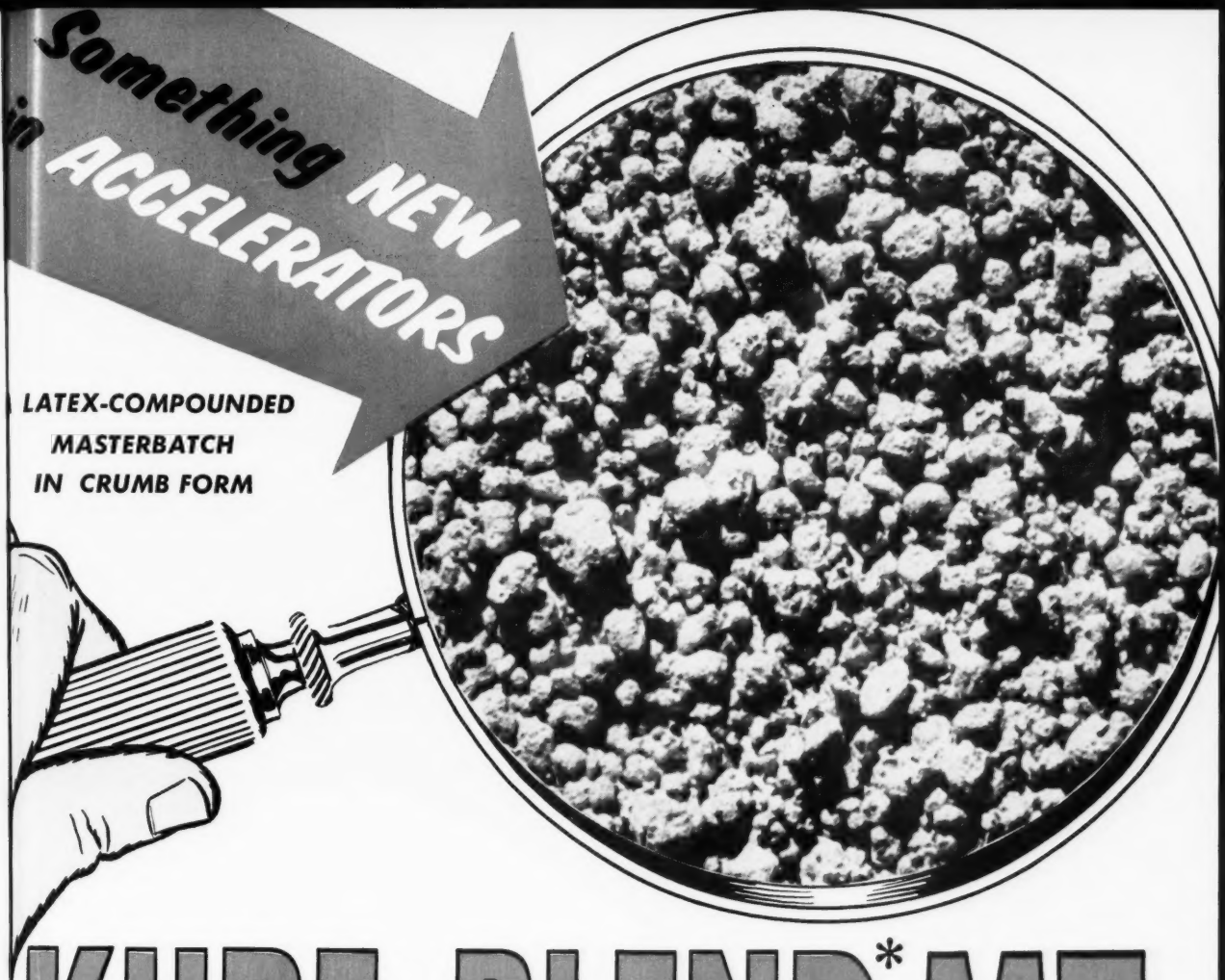
SKELLY

Skellysolve

SOLVENTS DIVISION, SKELLY OIL COMPANY
KANSAS CITY, MISSOURI

Something NEW in ACCELERATORS

LATEX-COMPOUNDED
MASTERBATCH
IN CRUMB FORM



KURE-BLEND* MT

50% TETRAMETHYLTHIURAM DISULFIDE
50% GR-S TYPE RUBBER

★ FAST—EASY DISPERSION ★ MORE ACCURATE WEIGHING ★ NON DUSTING

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GENERAL TIRE & RUBBER
Chemical Products

CHEMICAL DIVISION
THE GENERAL TIRE & RUBBER COMPANY **AKRON 9, OHIO**

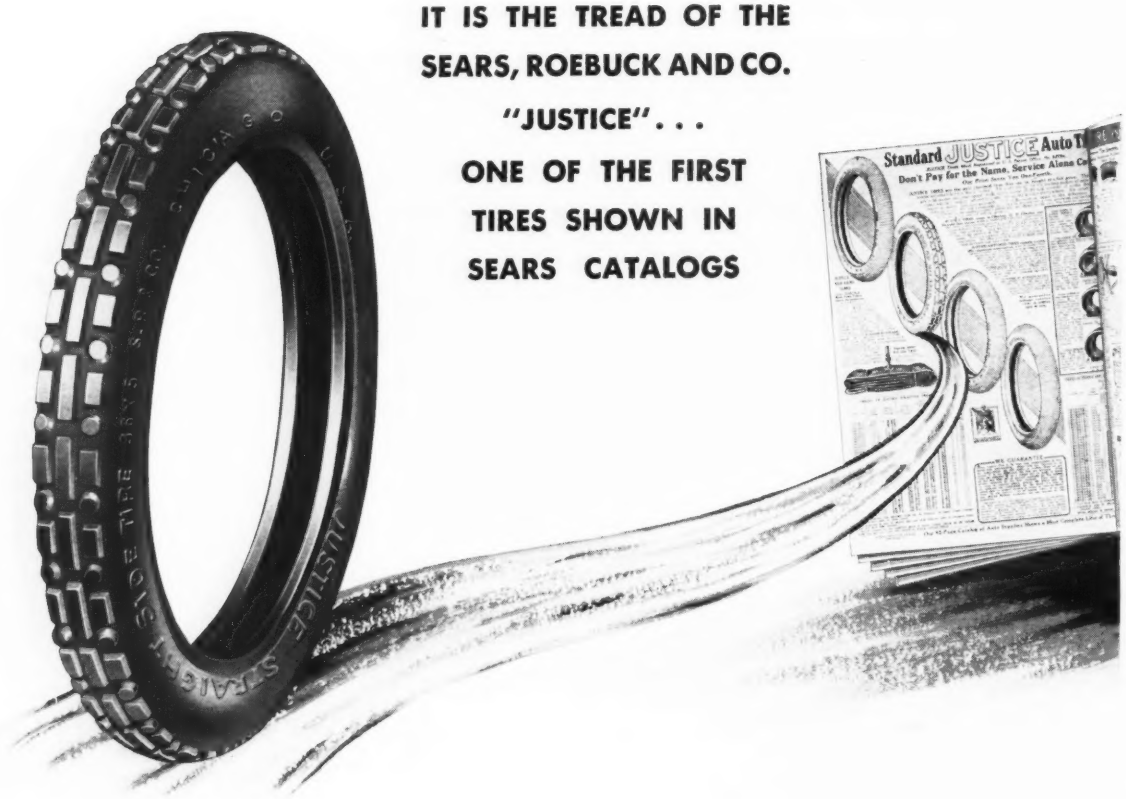
Technical Bulletins and samples available on request from either General Tire & Rubber or Distributor

• Trade Mark

*Patent Pending

REMEMBER THIS TREAD?

IT IS THE TREAD OF THE SEARS, ROEBUCK AND CO. "JUSTICE"... ONE OF THE FIRST TIRES SHOWN IN SEARS CATALOGS



A FORERUNNER of today's famous *Allstate* Tire, is the "Justice" Straight Side Tire of yesteryear . . . First shown in Sears, Roebuck and Company catalogs in 1914, it became, like the *Allstate,* one of the most popular of tires available by mail order.

Many of you in the tire industry today will remember the "Justice," and the riding comfort and safety it brought—straight from the pages of the "wish book"—to motorists of the time.

We remember the "Justice," here at Bridgwater, as we do *all* the well-known tires. Making *quality* molds for the production of *quality* tires has been our business for nearly half a hundred years, and many of the Nation's most famous tires came from molds built in Bridgwater shops.

Today, Bridgwater's Athens Machine Division, in Athens, Ohio, meets the tire industry's mold requirements in the largest plant in the world, we believe, devoted *exclusively* to tire mold making.

Here, skilled workmen and specialized machines — many of our own design — produce molds of every size and type, in engraved steel, cast iron, or aluminum. And at Athens, there are no other manufacturing obligations to distract Bridgwater craftsmen from the making of finest quality tire molds for the rubber industry — at decidedly favorable cost.

ATHENS MACHINE DIVISION

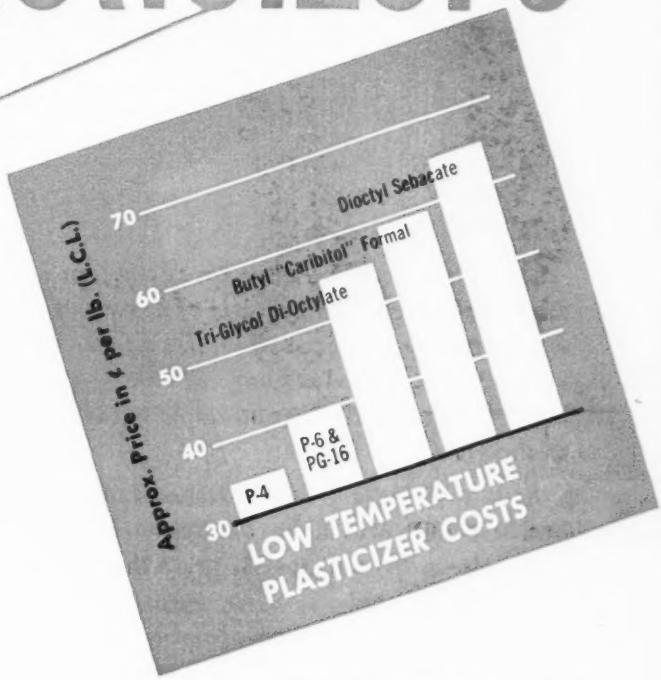
THE BRIDGWATER MACHINE COMPANY

Akron, Ohio

1808

HOW TO CUT COSTS ON LOW TEMPERATURE LOW VOLUME SWELL

SYNTHETIC RUBBER Plasticizers



FLEXRICIN® plasticizers are fully equivalent and, in many cases, superior to the commonly used low temperature plasticizers. Added features are their extremely low volume swell in aromatic fuels and excellent recovery on low temperature compression set. Their cost is much lower. Check this graphic comparison and you will see that costs can be cut substantially.

Flexricin Rubber Plasticizers:

PG-16, Butyl Acetyl Polyricinoleate	25% Nitrile Rubber
FLEXRICIN P-4, Methyl Acetyl Ricinoleate	40% Nitrile Rubber
FLEXRICIN P-6, Butyl Acetyl Ricinoleate	Neoprene GN
FLEXRICIN P-4, Methyl Acetyl Ricinoleate	GRS

ESTABLISHED 1857

THE Baker CASTOR OIL COMPANY

120 BROADWAY, NEW YORK 5, N. Y.

LOS ANGELES • CHICAGO

Mail convenient coupon for 1 quart samples and technical data sheets. Please clip to your letterhead.

Baker Castor Oil Company
120 Broadway, New York 5, N.Y.

Please send samples of the Ricinoleate Esters checked or Technical Bulletin.

☐ **PG-16** ☐ **P-4** ☐ **P-6**

☐ **Technical Data**

Name_____

Firm_____

Address_____

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RW-93

WIRE BRAID
helps put the *punch* in
UNCLE SAM'S AIR ARM!

HERE'S the plant that powers new super jets—one of the most powerful jet engines ever released for production!

Look closely and note the broad application of tubular wire braid. It is typical of many types and sizes regularly produced by National-Standard for aircraft service—used not only for electrical shielding, but to reinforce thermocouple harness leads, as shown.

National-Standard with the largest range of wire braiding equipment in the country, is well prepared to supply or develop special braid that will meet your needs *exactly!*

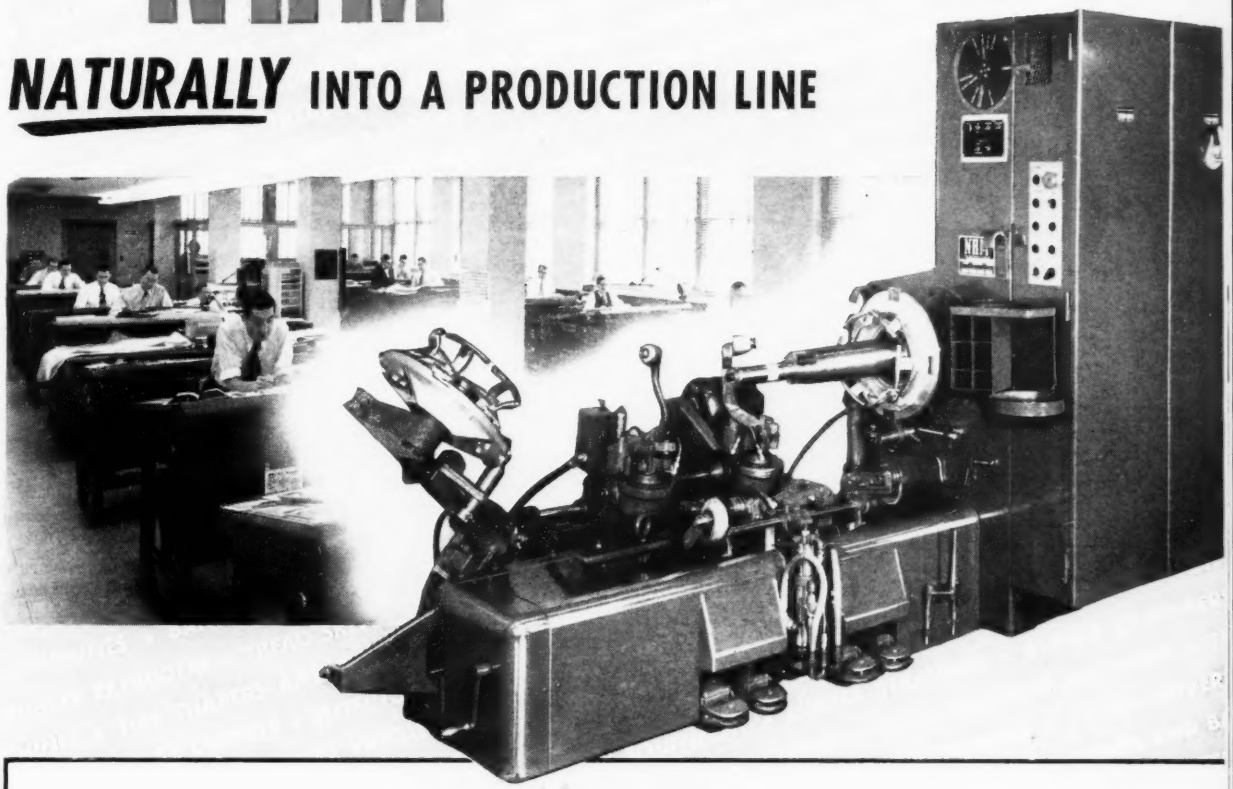
NS
NATIONAL-STANDARD Company
NILES, MICHIGAN

DIVISIONS OF NATIONAL-STANDARD CO.

ATHENIA STEEL	*Clifton, N. J.*	Flat, High Carbon, Cold Rolled Spring Steel
NATIONAL-STANDARD	*Niles, Mich.*	Tire Wire, Stainless, Fabricated Braids and Tape
REYNOLDS WIRE	*Dixon, Illinois*	Industrial Wire Cloth
WAGNER LITHO MACHINERY	*Jersey City, N. J.*	Metal Decorating Equipment
WORCESTER WIRE WORKS	*Worcester, Mass.*	Round and Shaped Steel Wire, Small Sizes

EVERY NRM MACHINE IS CUSTOM ENGINEERED TO FI

NATURALLY INTO A PRODUCTION LINE



It is not by chance that most manufacturers of rubber goods use NRM equipment . . . They know that *every* NRM machine is *custom* engineered to coordinate its work perfectly with the production equipment existing in the customer's plant.

NRM Tire Building Machines, for example, have "turn-up tools" that are *custom*-built to handle the customer's particular tire construction, and "sequence control cams" designed to give the proper sequence of building operations. Standard NRM Extruders have "feed boxes" and "feed screws," which are *custom*-built to key the machine *exactly* into a particular production setup. And standard NRM Bias Cutters do *custom* work, as a result of custom-built "control heads."

From experience, the rubber industry knows that NRM's quarter-century of *creative engineering* has produced rubber processing machinery of most practical and workable *basic* design. It knows, too, that NRM engineers—who are as familiar with rubber production requirements as they are with the machines themselves — give each NRM Machine the *custom* engineering that makes it slip naturally into a rubber production setup, and helps increase production "flow" in that plant.

2166

NATIONAL RUBBER MACHINERY COMPANY

NRM Our 25th ANNIVERSARY 1928-1953

Creative Engineering

General Offices & Engineering Laboratories: Akron 8, Ohio
East: 384 Getty Ave., Clifton, N. J.
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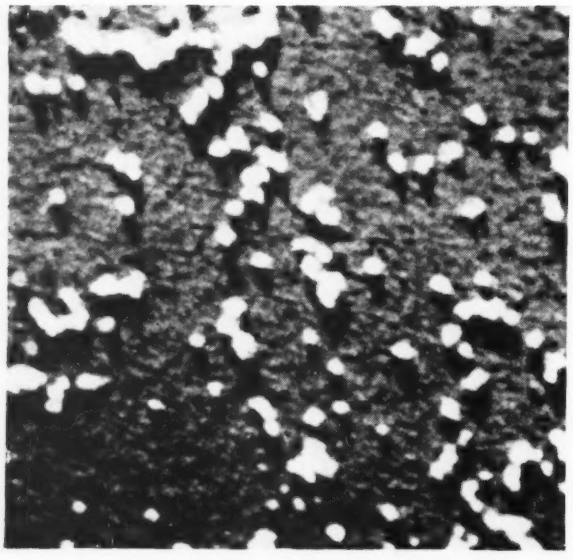
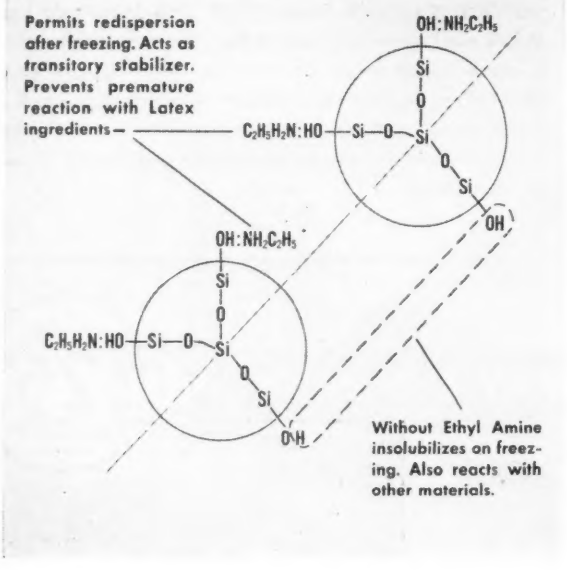
How Du Pont "LUDOX" can



What "LUDOX" is

"Ludox" is a 30% colloidal solution of almost pure amorphous silica particles (SiO_2) in the form of polymerized silicic acid. The electron photomicrograph—magnification 175,000 times—shows the fineness and uniformity of "Ludox" particles. The average particle's size of 17 millimicrons is below the range of the best carbon blacks.



Any of these valuable modifying effects can be produced by adding "LUDOX" to latex formulations

- Improved Adhesion
- Increased Stiffness
- Increased Water Resistance
- Increased Abrasion Resistance
- Decreased Dry Tack

How "LUDOX" works

The diagram at left shows surface hydroxyl groups on "Ludox" particles. These groups make the particles chemically reactive in contrast to commonly used dry fillers. This reactivity has led to many unusual properties and uses for "Ludox" in the latex field. The diagram also shows a typical "Ludox" reaction—with and without monoethylamine. The reaction with ethyl amine is useful in the stabilization of some latices containing "Ludox."

improve latex products

Your chemists can create new combinations of properties in latex-dipped goods, coatings, adhesives . . . whatever products you make—using Du Pont "Ludox"* colloidal silica. And new properties can mean new sales advantages —new markets for your products.

Here are some examples of how "Ludox" has improved latex products:

Neoprene thread was produced with a nearly doubled modulus over the entire range of elongation. Seven parts of "Ludox" were added per 100 parts neoprene latex. Modulus can be increased, too, in natural rubber films.

In neoprene-coated belting, adhesion was improved and flaking stopped by adding "Ludox." In a paper saturant, abrasion resistance was increased 20 to 40%!

A natural-rubber adhesive was doubled in strength of leather-to-leather adhesion when 20 parts of "Ludox" solids were added per 100 parts natural rubber latex solids. Such outstanding improvements have also led to the use of "Ludox" in GRS and neoprene latex adhesives and coatings.

An uncured Buna N solvent coating on cloth had no surface tack whatsoever when treated with "Ludox." In decreasing or eliminating tackiness, "Ludox" can be applied as an aftercoat or, in the case of latex, incorporated in the compound.

Neoprene films have shown exceptional increases in water resistance and decreases in water swelling upon addition of 20 parts "Ludox" solids per 100 parts neoprene latex solids.

Neoprene foam required about 20% less solids to attain a given modulus when 5 parts of "Ludox" solids were added per 100 parts dry neoprene. This saving of raw material was obtained without affecting flex life, bend flex, or compression set.

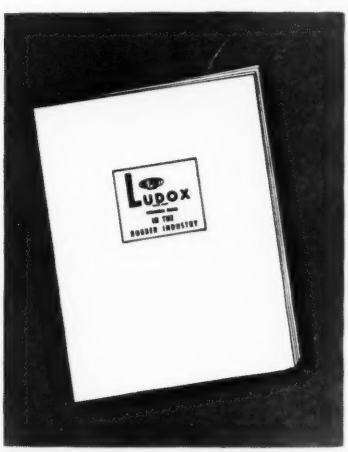
In these and other cases "Ludox" has provided combinations of properties difficult to achieve by any other means.

What's more, a little "Ludox" goes a long way.

To learn more about how silica chemistry with Du Pont "Ludox" can help improve your products, mail the coupon below, or write on your letterhead today.

*REG. U.S. PAT. OFF.

Send for this informative booklet: "'LUDOX' in the Rubber Industry"



E. I. du Pont de Nemours & Co. (Inc.)
Grasselli Chemicals Department, Wilmington 98. Delaware

Name_____ Title_____

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DU PONT "LUDOX" COLLOIDAL SILICA

REG. U.S. PAT. OFF.

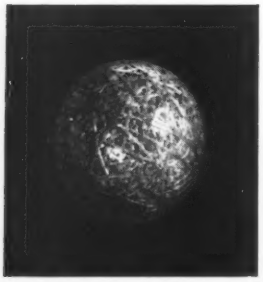
BETTER THINGS FOR BETTER LIVING...*THROUGH CHEMISTRY*

Top visibility... because of TITANOX® white pigment

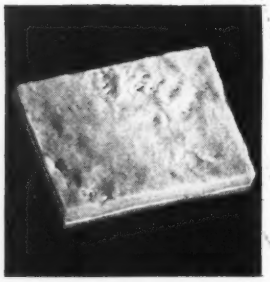
On green or fairway, this glistening white ball is always visible. That's because it's pigmented from the inside out with TITANOX white titanium pigments.

Consultation with our Technical Service Department is available to firms desiring assistance on rubber and plastic pigmentation problems. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; Atlanta 2; Boston 6; Chicago 3; Cleveland 15; Los Angeles 22; Philadelphia 3; Pittsburgh 12; Portland 9, Ore.; San Francisco 7. In Canada: Canadian Titanium Pigments Limited, Montreal 2; Toronto 1.

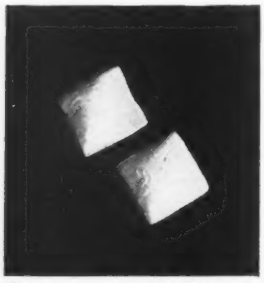
These steps show how visibility is built into a modern golf ball. Courtesy of the Acushnet Process Company, New Bedford, Mass.



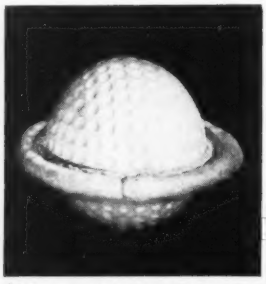
1. The liquid-filled rubber center is tightly wound with hundreds of feet of rubber thread.



2. Balata, the raw material for the cover stock, is a neutral grey before pigmentation.



3. These cover stock blanks are pigmented with TITANOX before molding into cups that form the cover.



4. The completed ball is trimmed and then a Titanox-pigmented coating is applied.

TITANOX®

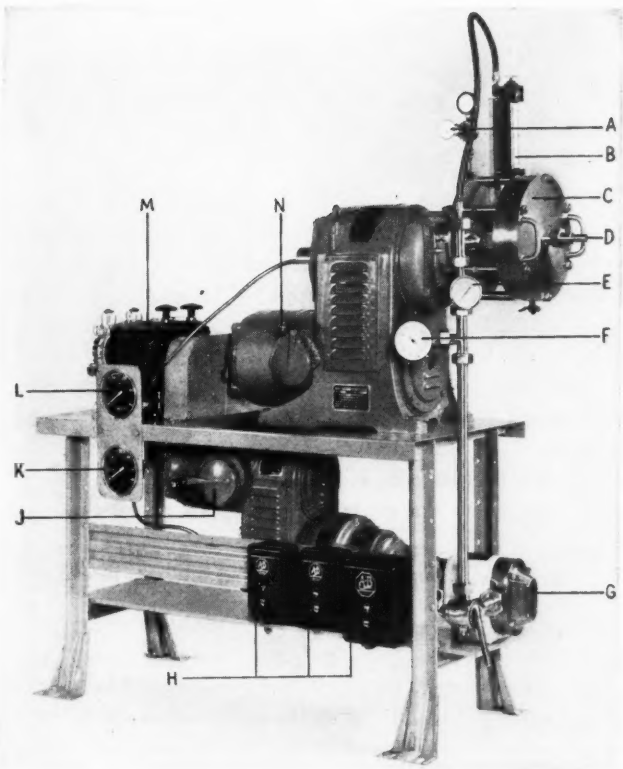
the brightest name in pigments

1815

TITANIUM PIGMENT CORPORATION

Subsidiary of NATIONAL LEAD COMPANY

NEW MIXER FOR FOAM RUBBER NOW IN WORLD-WIDE USE!



A. Air Pressure Regulating Valve
B. Air Flowmeter
C. Mixing Head
D. Discharge Hose Connection
E. Product Thermometer
F. Pressure Gauge
G. Latex Pump
H. Starting Boxes
J. Pump Speed Regulator
K. Pump Tachometer
L. Mixer Speed Tachometer
M. Chemical Proportioning Pumps
N. Mixer Speed Regulator

Only five years ago this new Oakes Continuous Automatic Mixer was unknown. In this short time it has come into use in large plants and small—now more than 300 installations—in the United States, France, England, Canada, Italy, Germany, Holland, Denmark, and other countries. In the United States, for example, it has been adopted by every leading producer of foam rubber without exception. As many as 15 Oakes Continuous Automatic Mixers have been included in single installations. Complete batteries of old machines have been taken out and replaced by Oakes Mixers because of their great advantages.

The Oakes Mixer can be had in two models. It produces foam rubber continuously from make-up tanks to molds, with savings in latex of from 12 percent to 15 percent. Production is from 150 pounds per hour to 900 pounds per hour in the Model 10M3 shown here, up to 1800 pounds per hour from the larger Model 14M5. Quality of foam is superior—more uniform and much finer cell structure, providing greater strength, stability, and smoothness in the finished product. Injection molding is simplified—the closed molds are filled full and rejects are reduced. Human judgment is replaced by mechanical controls that are accurate and immediately responsive. Production is unaffected by weather, climate or air conditions. One Oakes mixer, moreover, will do the work of several batch mixers with large savings in labor and floor space. In fact the advantages of these and other features are so great as to put the user immediately into a much stronger competitive position.

This mixer is patented, exclusive equipment available only through the E. T. Oakes Corporation. We will welcome the opportunity to send you full information.

Oakes Continuous Automatic Mixer

Available only through

THE E. T. OAKES CORPORATION

COMMACK ROAD • ISLIP, N. Y.

Three grateful people say: "We're HERE ... because you were THERE!"

Communist machine-gun fire dropped him in combat. But whole blood kept him alive, saw him through the hospital. He thanks you for his life.

She'd been exposed to polio. A new serum, *Gamma Globulin*, made from blood, helped ward off the dread disease. She thanks you for her life.

A tornado whipped suddenly across her home town. She was badly injured by falling debris. But a quick operation, several transfusions pulled her through. She thanks you for her life.

Each one of these people is alive today because someone gave blood.

If you've given blood before, you know how easy it is —how quick and painless. And you know what a wonderful feeling it is when you realize that what you've done may give another person his life.

Now you are asked to give blood . . . again and again. And you can do it safely every 3 months.

Because America's need for blood has increased enormously—for our armed forces, for accident and disaster victims at home, for new disease-fighting serums.

Many a life hangs in the balance! Will you help? Call your Red Cross, Armed Forces or Community Blood Donor Center today!

BUSINESS EXECUTIVES CHECK THESE QUESTIONS

If you can answer "yes" to most of them, you—and your company—are doing a needed job for the National Blood Program.

- ◯ HAVE YOU GIVEN YOUR EMPLOYEES TIME OFF TO MAKE BLOOD DONATIONS?
- ◯ HAS YOUR MANAGEMENT ENDORSED THE LOCAL BLOOD DONOR PROGRAM?
- ◯ HAS YOUR COMPANY GIVEN ANY RECOGNITION TO DONORS?
- ◯ HAVE YOU INFORMED EMPLOYEES OF YOUR COMPANY'S PLAN OF CO-OPERATION?
- ◯ DO YOU HAVE A BLOOD DONOR HONOR ROLL IN YOUR COMPANY?
- ◯ WAS THIS INFORMATION GIVEN THROUGH PLANT BULLETIN OR HOUSE MAGAZINE?
- ◯ HAVE YOU ARRANGED TO HAVE A BLOODMOBILE MAKE REGULAR VISITS?
- ◯ HAVE YOU CONDUCTED A DONOR PLEDGE CAMPAIGN IN YOUR COMPANY?
- ◯ HAVE YOU SET UP A LIST OF VOLUNTEERS SO THAT EFFICIENT PLANS CAN BE MADE FOR SCHEDULING DONORS?

Remember, as long as a **single** pint of blood may mean the difference between life and death for **any** American . . the need for blood is **urgent!**

NATIONAL BLOOD PROGRAM

GIVE BLOOD

...give it again and again

HEY Don't junk that Banbury* rotor

Farrel-Birmingham will put it back into shape for you

This rotor is pretty badly worn—obviously. But, Farrel-Birmingham has blueprints which show just how much to build it up in order to return it to its proper size and shape.

Worn rotors are rebuilt to original dimensions in a sequence of 42 separate operations, including three nondestructive tests for soundness. Result: *rebuilt rotors are just exactly as good as new ones,* and carry the same guarantee.

The repair and rebuilding of other parts is handled with equally painstaking care. Farrel-Birmingham knows how to restore and often improve on the original working efficiency of each part and, in addition, has the manufacturer's special interest in maintaining the reputation of the Banbury mixer.

For the best in Banbury repair work, write, wire or telephone one of the offices listed below.

FREE INSPECTION SERVICE

A complete and competent inspection service, by factory-trained mechanics, is available to all users of Banbury mixers in the United States. A request will bring an inspector to your plant, promptly and without cost to you. He will examine your machines thoroughly, report to you on their condition, and recommend any work that may be necessary to put them into first-class shape.

*Trade Mark

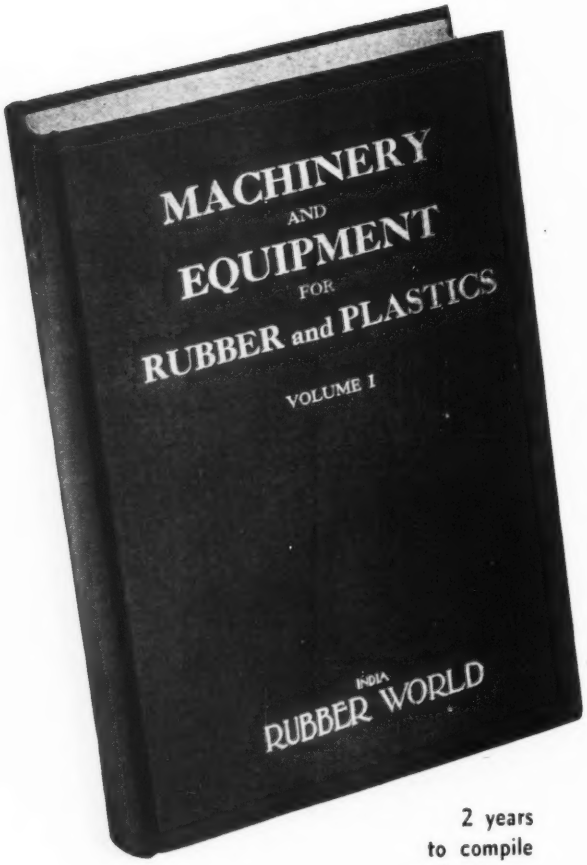
FARREL-BIRMINGHAM COMPANY, INC.

ANSONIA, CONN. (Telephone Ansonia 4-3331)
AKRON, OHIO, 2710 First National Tower (Tel. Jefferson 3149)
CHICAGO, ILLINOIS, 120 So. LaSalle Street (Tel. Andover 3-6434)
LOS ANGELES, CALIF., 2032 Santa Fe Avenue (Tel. Lafayette 3017)
HOUSTON, TEXAS, 860-A M & M Building (Tel. Preston 4472)

FB-850

Farrel-Birmingham®

The only book of



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to compile
and edit —

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Table of Contents

Chapter 1. Mills
Chapter 2. Mill Accessories
Chapter 3. Mixers
Chapter 4. Calenders & Accessories
Chapter 5. Extruders
Chapter 6. Extruder Accessories
Chapter 7. Presses, Compression
Chapter 8. Press Accessories
Chapter 9. Presses, Injection
Chapter 10. Molds & Mold Accessories
Chapter 11. Web Coating & Handling Equipment
Chapter 12. Pressure Vessels
Chapter 13. Heaters, Dryers and Coolers
Chapter 14. Tire & Tube Machinery
Chapter 15. Hose & Belting Machinery
Chapter 16. Footwear Machinery
Chapter 17. Wire & Cable Machinery
Chapter 18. Sole & Heel Machinery
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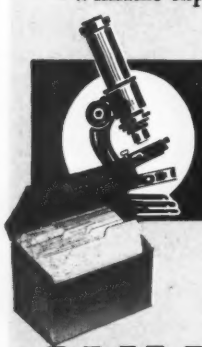

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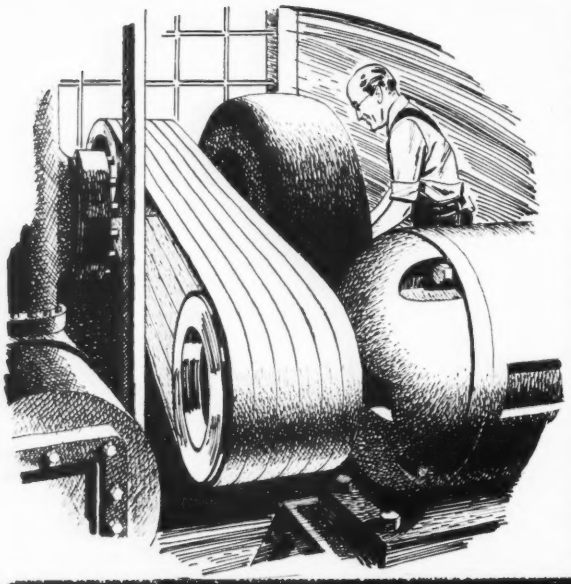

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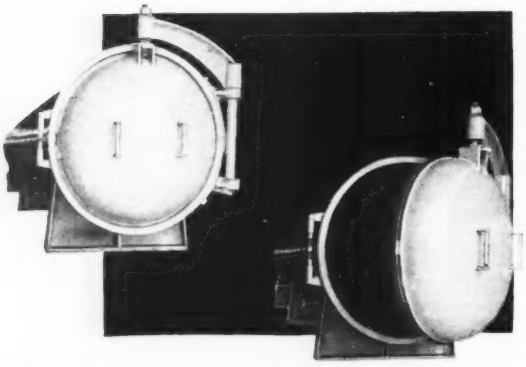

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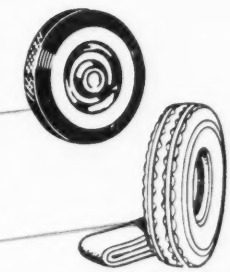

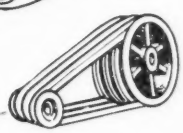

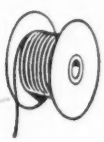

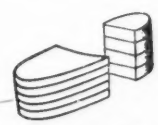

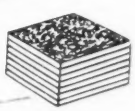

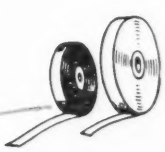

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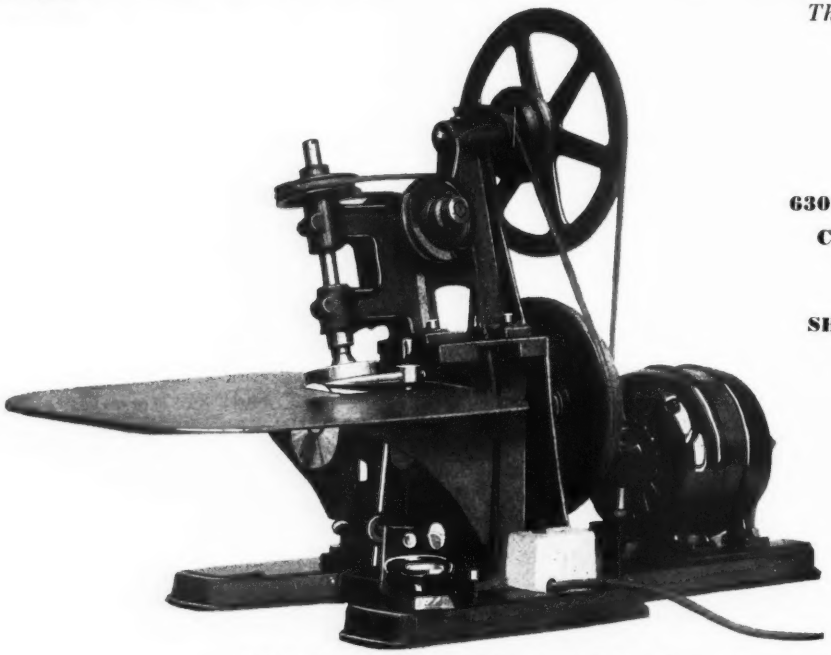

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FORMULAE	A	B
Nitrile Rubber (32% acrylonitrile content)	100	100
Hi-Sil "C"	65	.....
MPC Black	.....	60
Zinc Oxide	5	5
Sulfur	2.0	1.5
MBTS	1.5	1.5
TMTDS	0.5	.....
DPG	.....	0.2
25°C. m.p. Coumarone resin	8	8
Aromatic softener	7	7
Stearic Acid	1.5	1.5

Mins. Cure at 310°F	Modulus 300%	Tensile	Elong.	Duro. Hard. 0″	Duro. Hard. 30″	Tear lbs./inch
Compound A—Hi-Sil "C"						
30	1890	3990	510	78	66	370
45	1740	3830	500	78	67	350
90	2030	4200	490	78	70	430
Compound B—MPC Black						
30	1840	3470	490	72	59	330
45	2100	3720	470	73	60	320
90	2500	3990	430	73	62	310

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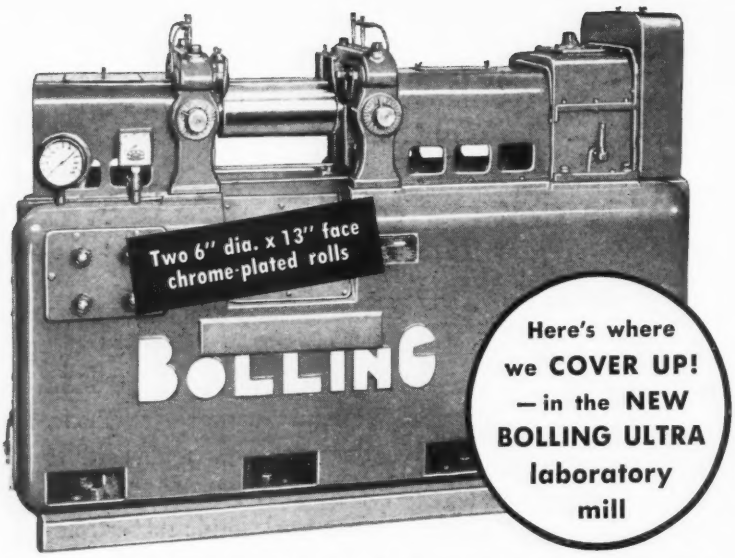

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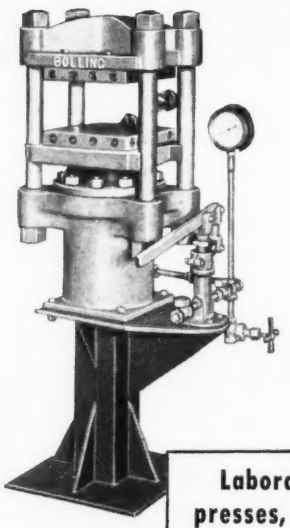

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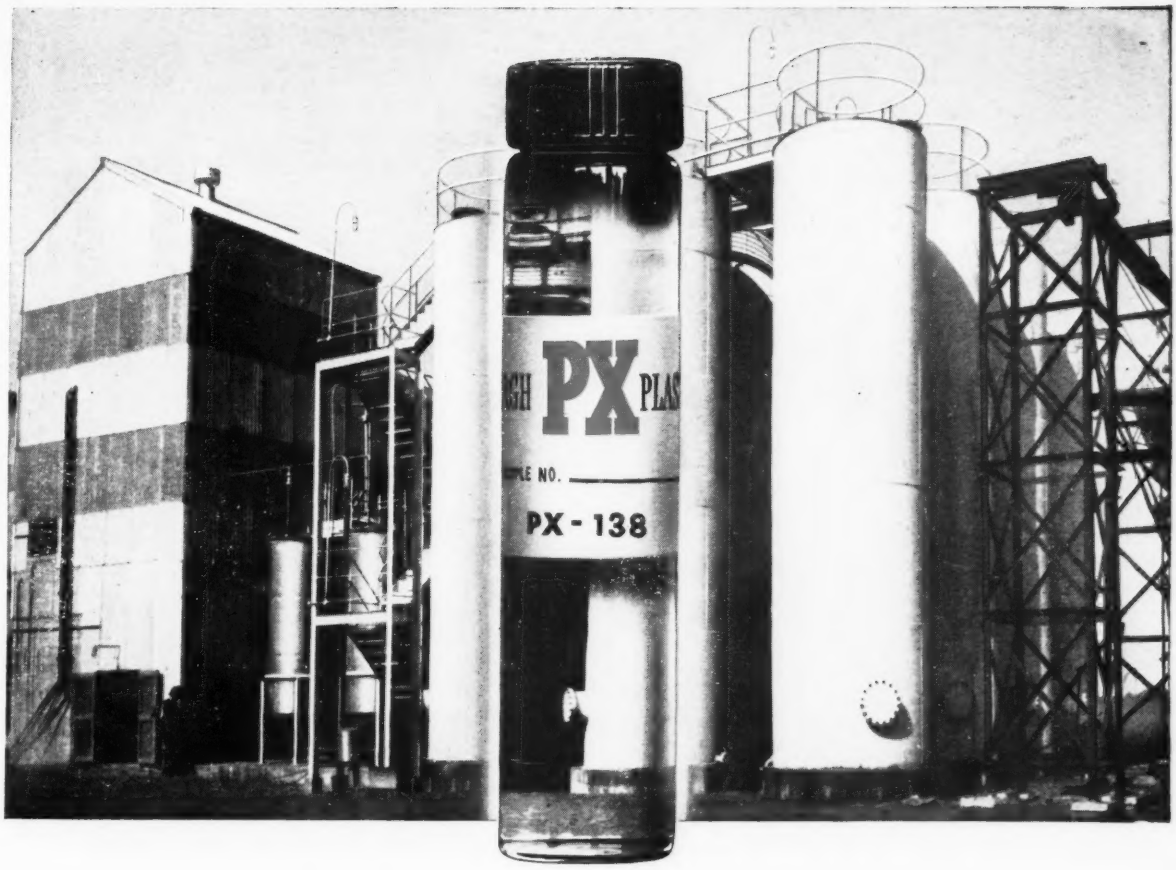

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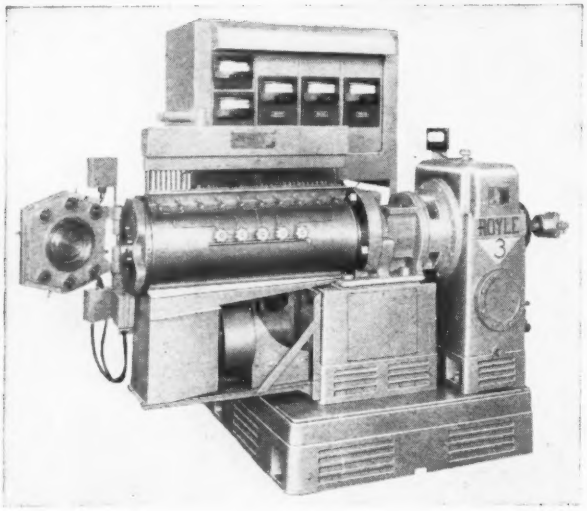

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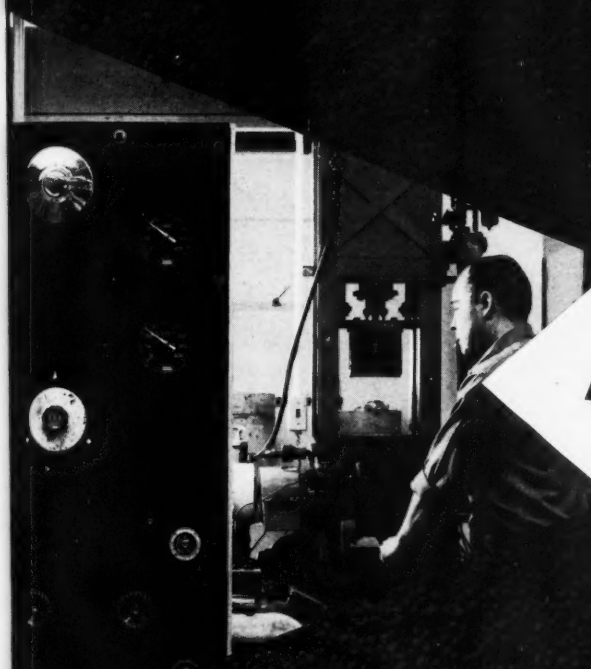

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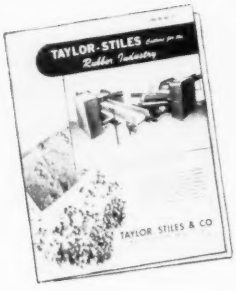

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(Index No. App. 202)

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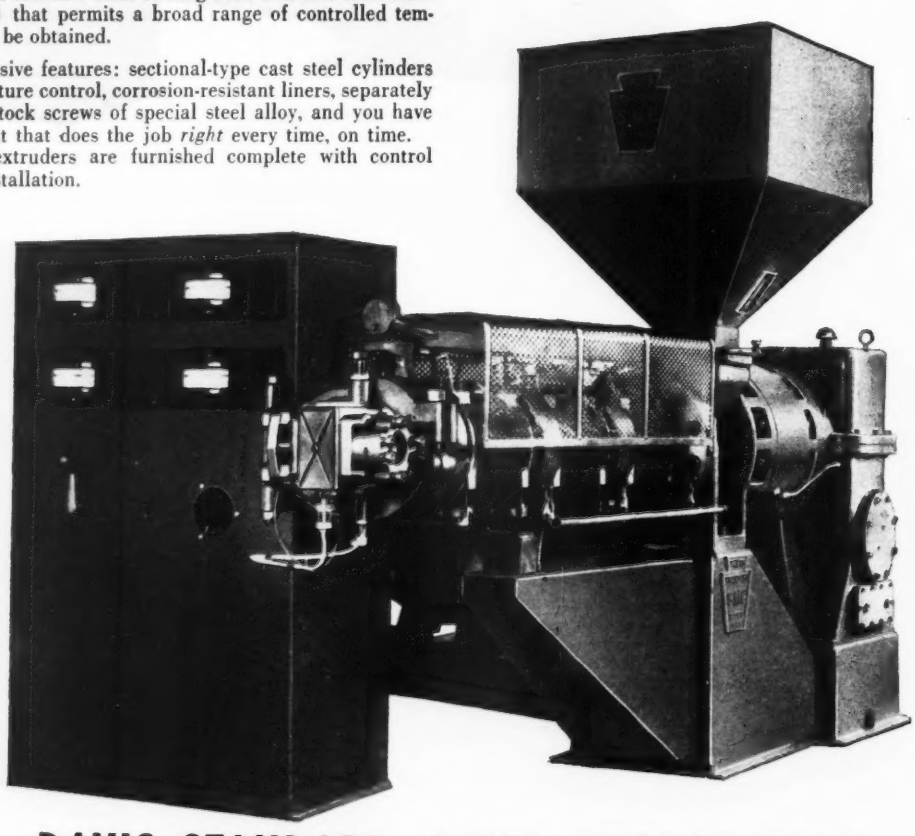

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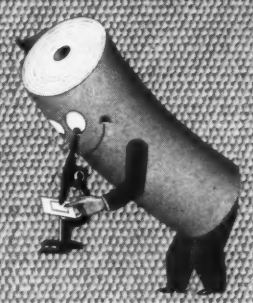

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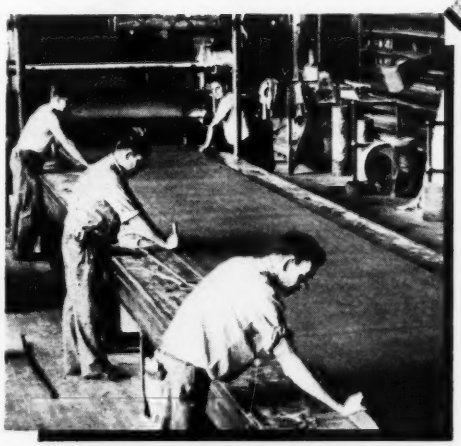

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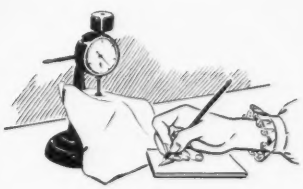

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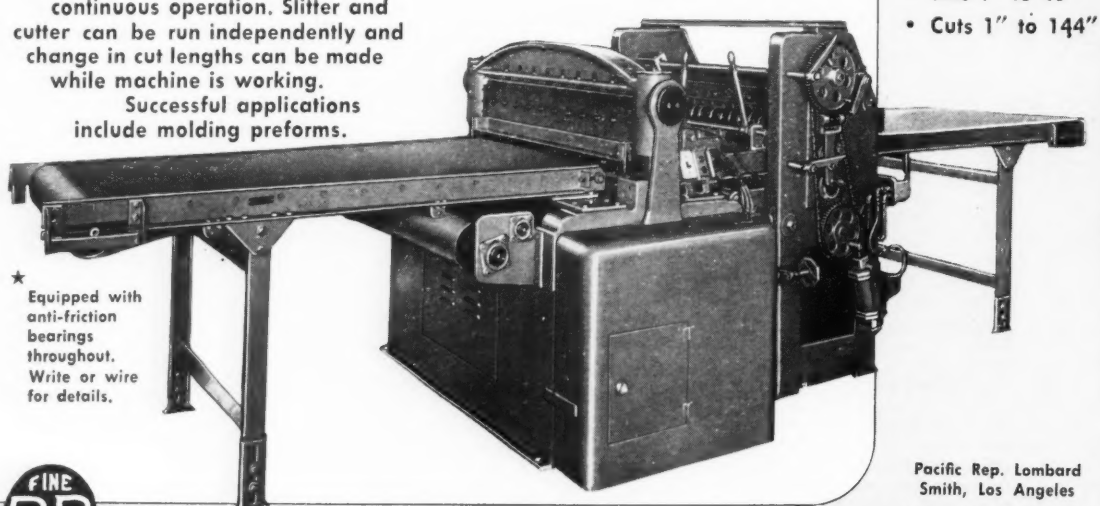

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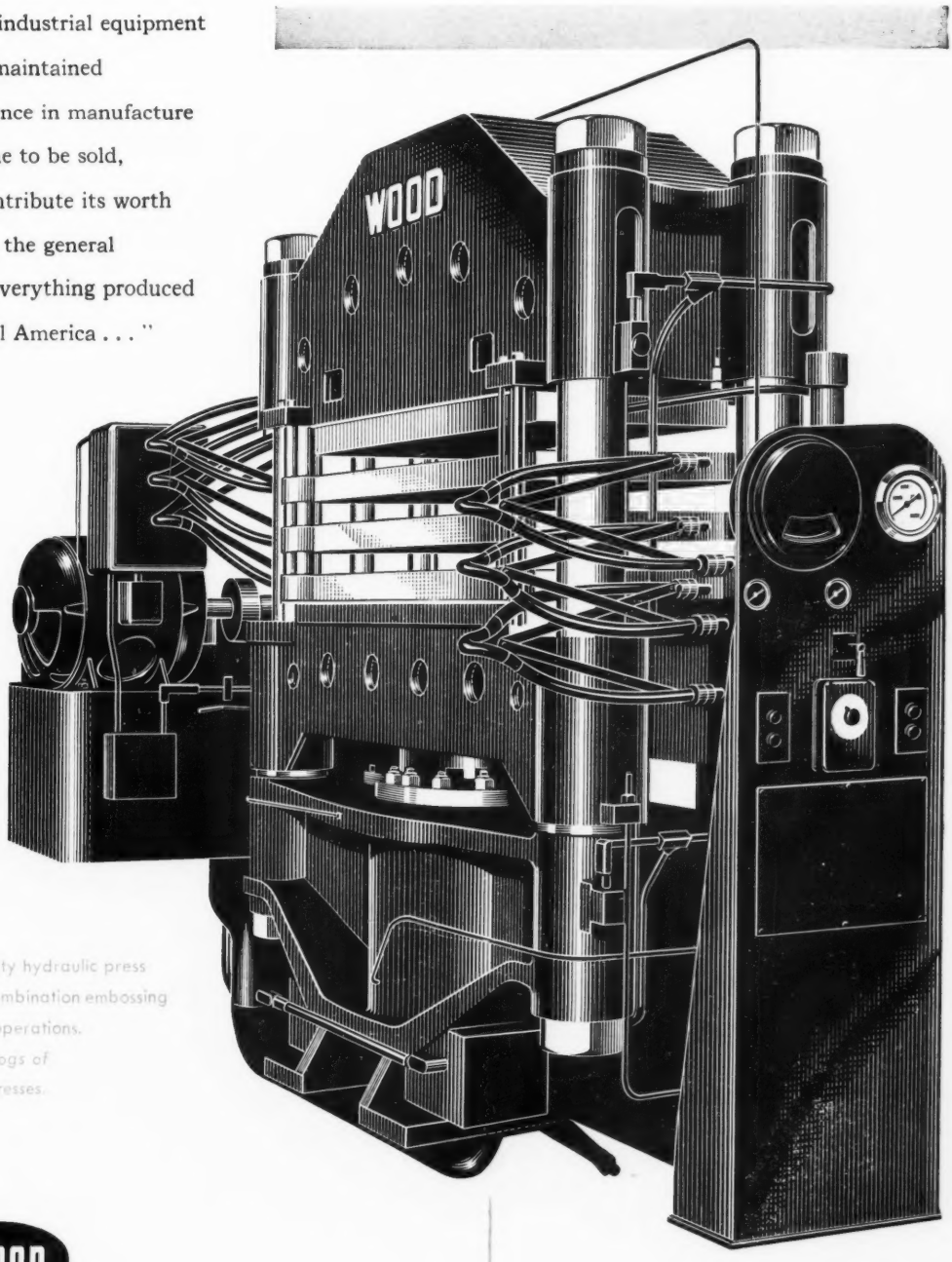

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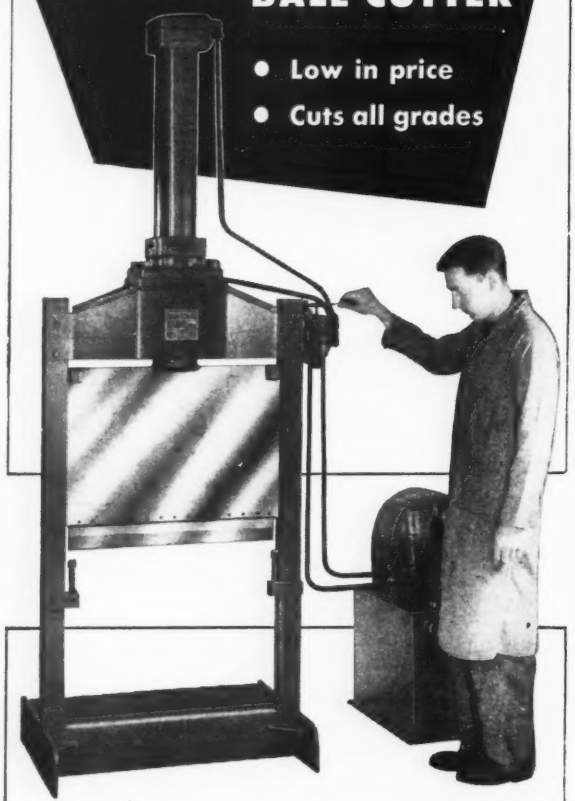

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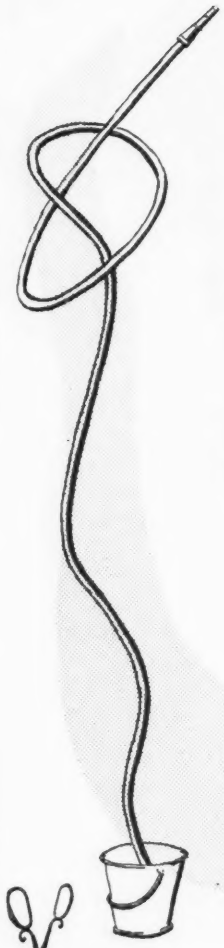

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SEPTEMBER, 1953
Vol. 128—No. 6

Table of Contents

Progress in Manufacturing Methods in the Molded Rubber Products Industry
J. H. Gerstenmaier and F. J. Fetter 761

Compounding of Silicone Rubber
Arbelia C. Glime, Norman A. Duke, Clinton M. Doede 766

Methods Employed in Compounding Research—X
I. Drogin 771

Engineering Design for Rubber-Phenolics
A. P. Landall 776

Departments

Editorials 775
Plastics Technology 776
Scientific and Technical Activities 783
News of the Month:
United States 785
Obituary 795
Financial 798
Trade Lists Available 840
New Goods 802
Machinery 806
Materials 812
Rubber Industry in Europe 814
Far East 820
Book Reviews 822
New Publications 823
Bibliography 826

Market Reviews

Rubber 830
Reclaimed Rubber 830
Scrap Rubber 830
Rayon 830
Cotton and Fabrics 832
Compounding Ingredients 834

Statistics

United States, for May, 1953 840
Imports, Exports, and Reexports of Crude and Manufactured Rubber 840
Tire Production, Shipments, and Inventory 832

CLASSIFIED ADVERTISEMENTS .. 835

ADVERTISERS' INDEX 841

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WORLD
VOL. 128—NO. 6 SEPTEMBER, 1953

Progress in Manufacturing Methods in the Molded Rubber Products Industry[1]

J. H. Gerstenmaier[2] and F. J. Fetter[2]

THE design engineer takes for granted a wide variety of molded rubber products. He quickly classifies engine mountings, vibration dampers, rubber bushings, seals, flexible couplings, and rubber joints as exclusive fields for molded rubber. The automotive, appliance, oil producing, mining, aircraft, and miscellaneous hydraulic and pneumatic equipment manufacturers now depend upon molded rubber as an irreplaceable component for their product.

The rapid development and expansion of the molded rubber products industry is plainly evident when today's products are compared with molded products produced before World War II. The ability of molded rubber or rubber and metal products to dampen vibration, seal, cushion, and resist abrasion, coupled with a growing knowledge of its adaptability to fill industrial needs, has greatly expanded its use. The production application, however, was made possible on a large-volume, economical basis by the simultaneous development of the rubber manufacturing processes, controls, and equipment.

Today the typical plant devoted to the manufacture of molded rubber products must be capable of producing parts to very close dimensional tolerances, of controlling compound physical properties to an exacting degree, and of inspecting and testing parts to assure they meet functional requirements for the many and varied industrial, transportation, and appliance fields. Electronically controlled cutters, carefully controlled cementing and drying machines, press cycles automatically regulated, higher vulcanizing temperatures and molding pressures, cold temperature tumbling for flash removal, and conveyorized load deflection testing machines all have aided in this progress toward more proficient and exacting manufacturing techniques.

As a result, mold rubber manufacturing has developed as an important division of the rubber industry. Industrial molded rubber products are no longer considered sideline products to fill a few excess hydraulic presses in miscellaneous mechanical goods plants. Manufacturing processes have developed which are applicable only to molded products and are even further specialized to apply only to certain types of products in the industry.

This paper will show the progress in manufacturing techniques that has taken place to lead the industry away from the general classification of miscellaneous mechanical rubber goods to the highly specialized category of industrial molded product manufacturing.

The basic mixing of the rubber compound will be excluded from this paper because the manufacturing techniques here closely follow those used for any rubber manufacturing operation. A plant devoted to the manufacture of molded rubber products probably will have one or more Banbury mixers, plus other basic machinery, with variations in size of supplementary equipment, depending upon the quantity and the type of rubber compound usually produced. The specialized operations begin when the mixed compound is being prepared to the right shape and size for molding; therefore the following steps through the factory will be discussed: (1) uncured rubber preparation; (2) metal preparation; (3) mold design and curing; (4) finishing processes; (5) inspection and testing.

Preparation of Uncured Rubber

Uncured rubber which ranges from a soft gum-like material to a leathery-hard material is shaped prior to the actual molding operation by calendering, tubing, or slabbing methods. These are standard rubber manufacturing operations, and it is only the variations or the refinements of them for specific molded product purposes that have made these compound preparation methods distinctive for a molded rubber product plant.

The type of compound, quantity requirements, required size and shape of the mold preparation, and method of molding determines the type of preparation machinery that will be utilized. A large ½-inch thick 30-inch diameter piece of rubber most likely will be slabbed from a mill and template cut to size; a coated-fabric preparation

[1] Presented before the Rubber & Plastics Division, ASME, Columbus, O., Apr. 29, 1953.
[2] Goodyear Tire & Rubber Co., St. Marys, O.

for a diaphragm will be prepared on a calender and die cut to the proper size on a punching machine; whereas a piece of rubber ½-inch O.D. will be tubed in a continuous length from a tube machine and by means of a synchronous operation or a later operation be cut to the proper length. These are conventional methods with which all persons familiar with the rubber industry are acquainted.

The changes that make them especially applicable to a molded rubber products plant are the changes necessary to provide utmost accuracy or efficiency. The electronic cutter is an example of this point, where the cutting operation is synchronized with the tube machine and the rubber is accurately cut to the desired length. (See Figure 1.)

As the methods of molding change, the demand on the preparation division also changes. The conventional method of molding an item is to place a piece of uncured rubber of the proper weight and size in/or adjacent to each cavity in the mold. This requires relatively small-size tubing, extensive cutting, and check weighing operations. With the newer transfer and jet injection molding methods, the requirement is for large pieces of tubed or calendered rubber sufficient in volume for one piece to fill all the cavities in the mold. This method demands larger equipment with provisions for adequately cooling the large sections of rubber.

Metal Preparation

Many molded products have inserts of metal, fabric, hard plastic, carbon, etc. incorporated in their design. At the beginning of World War II aluminum presented problems of bonding that almost eliminated integral rubber-aluminum products from the realm of practical manufacturing. Today, steel, cast-iron, aluminum, stainless steel, die-cast metals, magnesium, and almost all alloys or basic metals are being successfully bonded to rubber, with adhesion strengths often exceeding the ultimate tensile strength of the rubber compound.

The obtainment of a satisfactory bond is only the first consideration because the further requirement that the bond be produced readily in quantity on a constant basis is equally important. Since there is no universal method or no all-purpose cement to handle all combinations of compounds and inserts, it is generally necessary to have sufficient equipment to produce the best and most uniform type of adhesion for each specific application. The required equipment will depend upon the type of adhesion used.

Two basic types of adhesion methods are in use today: namely, chemical and mechanical, and in both methods the actual bonding of the rubber to the insert takes place while the product is being formed and cured in the mold.

The brass plate method utilizing a carefully controlled brass bath (approximately 30% zinc, 70% copper) is classified as a chemical type. This method, used by many rubber companies, deposits a brass plate on the metal insert which reacts during the curing cycle with certain ingredients of the compounded rubbers to form another chemical composition at the surface of the metal, which, in turn, provides a strong bond between rubber and metal. The use of brass plating for adhesion is recommended highly for providing a consistent and dependable method of obtaining satisfactory bonds which will withstand a wide variation of functional requirements. (See Figure 2.)

It may be necessary to remove excessive grease or heavy oils by degreasing or to remove heavy scale by grit or sandblasting prior to plating. A hand sandblast operation can be utilized to clean the bonding area on small inserts with thin cross-sections. Grit tumblasting operations in machines, varying from 5-17 cubic foot content, can be used for the majority of metal inserts. (See Figure 3.)

Mechanical-type bonds are obtained by the use of chlorinated rubber or phenolic resin base adhesives; these methods are required for different combinations of natural or synthetic rubber and for different metals where brass plating is not adaptable or available.

Metal inserts always should be cleaned carefully by some prior operation, sand or grit blastings, degreasing, etc. The adhesive should be agitated and at the proper temperature brushed, sprayed, or dipped on the area to be bonded. The age, viscosity, and general condition of the adhesive are critical and must be controlled, and the application and drying of the adhesive must be regulated carefully. In addition, many of the adhesives are unstable in humid air and must be covered immediately with another more stable rubber cement. Figure 4 illustrates an automatic adhesive cement applicator and controlled drying conveyor.

Mold Design and Curing

Much of the progress or development in the industry can be attributed to the great advancement and specialization in the press room or curing operation.

Conventional or compression, transfer, and full injection molding comprise the mold processes available today. Plants specializing in the manufacture of molded rubber products, and capable of producing all types and sizes of industrial products, will have groups of curing presses in the range of 12- by 12-inch platens to 40- by 40-inch platens, with special-size presses developed for specific products or product lines. Curing temperatures ranging from 290 to 360° F. and unit hydraulic pressures ranging from 1,200 psi. to 2,500 psi. are normally used, although platen temperatures exceeding 360° F. can be obtained, when necessary, by electrical heating devices.

Compression Molding

The majority of the molded rubber products are produced by conventional molding processes; that is, the uncured compounded rubber is prepared to the correct size and weight, placed in/or adjacent to the cavity, and forced into place by the pressure of the mold closing in the press.

Both conventional and automatic molded products presses are versatile and adaptable to a large line of products. In either case the trend has been toward equipment with temperature controls, automatic timers, and controlled pressures that will allow parts to be molded with close dimensional tolerances, with higher pressures, and with more accurate cures. Figure 5 shows an automatic mechanical-type press, and Figure 6 shows an automatic hydraulic press.

Hydraulic presses which originally were considered standard multi-purpose presses by the press manufacturer have, in many caes, been redesigned by the rubber manufacturer. These presses now incorporate mechanical mold handling equipment, hydraulic push downs, automatic bumping devices, mechanical mandrel or insert injector devices, etc., which provide means for more accurate and more economical mold handling. Figure 7 shows a special mold and some special handling equipment on a hydraulic press.

In like manner, compression molds should be made sufficiently strong to withstand higher molding pressures, and accurately machined to give the dimensional tolerances required for the product. The complexity of many

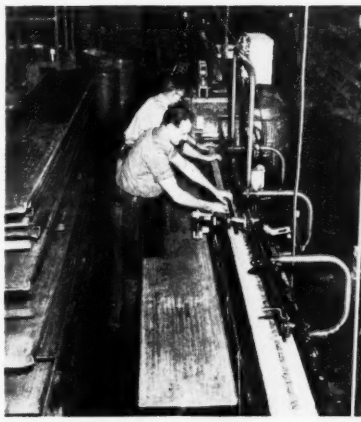


Fig. 1. Electronically Controlled Cutter Synchronized with Tube Machine

Fig. 2. Automatic Brass Plate Automotive Brake Pedal-Pad Metals Are Being Placed on Rack While Plated Inner Truck-Engine Mount Metals Are Being Removed

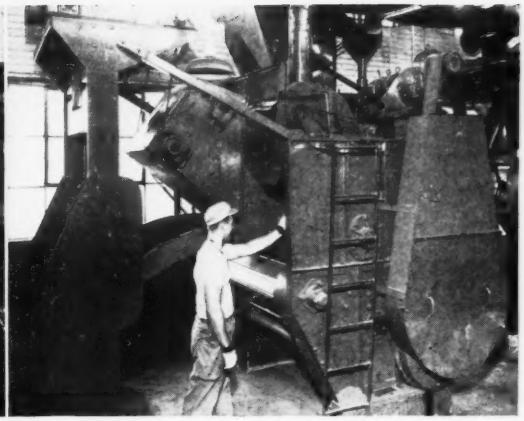


Fig. 3. Grit Blasting Machine

Fig. 4. Automatic Adhesive Cement Applicator and Controlled Drying Conveyor (Aluminum Aircraft Mount Bell Metals Are Shown at Beginning and End of Cementing and Drying Cycle)

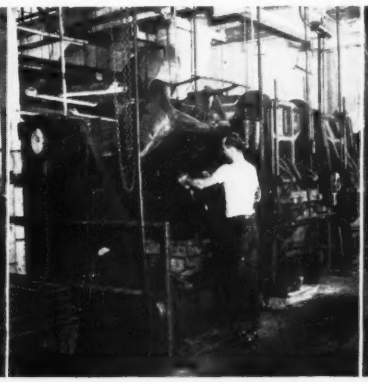


Fig. 5. Automatic Mechanical-Type Presses

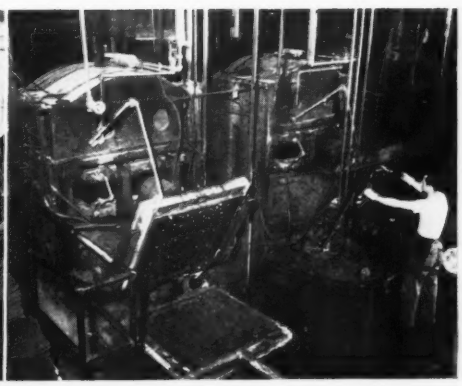


Fig. 6. Automatic Hydraulic-Type Presses

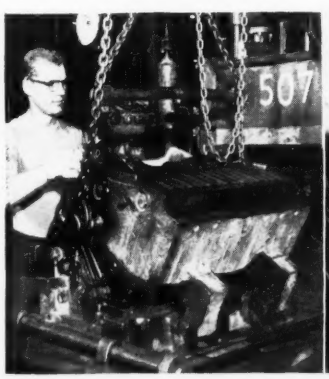


Fig. 7. Curved Vent Automotive Weatherstrip Mold Being Operated in Conventional Hydraulic Press Fitted with Special Handling Equipment

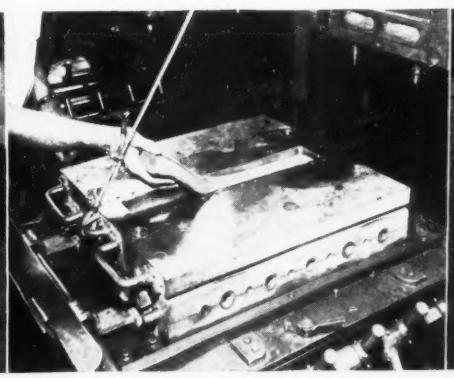


Fig. 8. Transfer-Type Mold Being Loaded with Uncurved Compound

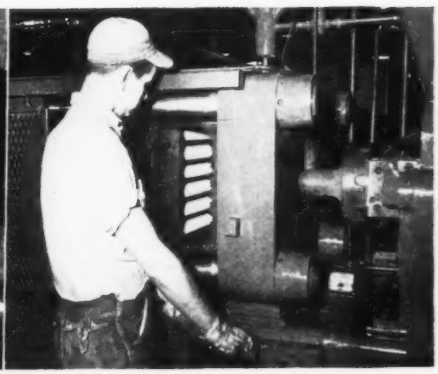


Fig. 9. Screw-Type Injection Press

of the molded products in use today has resulted in the use of complicated and exacting molds. The use of precision cast or hobbed cavities, permanent magnets to hold metal inserts in place, loose drop-type inserts integral with the mold to eliminate handling, and cavity layout to facilitate strip loading are some of the refinements promoting better manufacturing operations.

Transfer and Injection Molding

Rubber forced from a central pot through sprues into mold cavities provides an efficient method of producing many types of products impractical to compression mold.

This method of transfer molding, adapted to conventional hydraulic presses, allows a variable injection and mold clamping pressure. It generally results in lower mold maintenance since the mold is completely closed and registered at the beginning of the molding cycle. The variable injection pressure permits the molding of parts with no or extremely thin flash. Figure 8 shows a transfer-type mold being loaded.

Injection machines utilize a screw mechanism to force unvulcanized rubber into a tightly closed mold. Forcing the rubber through small passages under high pressure increases the temperature of the injected compound sufficiently to reduce curing time considerably. Figure 9 is a screw-type injection press.

Because of the low thermal conductivity of rubber, thick products heated from the surface only require long curing times at relatively low temperature. Curing such products at the usual temperatures and for a time long enough to obtain complete cure in the center often results in serious overcuring at the surfaces. Another disadvantage of normal-temperature curing of thick products is a tendency to back rind at the mold parting line. Dielectric heating of the rubber before placing it into the mold helps overcome these difficulties. This process reduces curing time, increases mold turnover, and reduces the number of certain types of rejects. The principal advantages of this method are faster and more uniform heating since the preform actually becomes slightly hotter in the center than on the outside.

The principle of dielectric heating is rather simple, though the equipment necessary for heating is relatively complicated. When a voltage is applied to a non-conductor in a condenser, the molecules are distorted, and if the voltage is alternating, they will tend to oscillate, thus dissipating energy and causing a rise in temperature. The amount of oscillation is dependent upon the voltage applied. By applying a high voltage to the material to be heated, and rapidly reversing the potential on the condenser (usually from 1,000,000 to 35,000,000 times per second in the case of rubber) a considerable temperature increase can be obtained. Since the temperature rise is nearly uniform throughout the material, this method is especially effective in preheating of relatively thick rubber.

This method of heating can also be used to soften rubber or rubber-like materials, permitting easier mold flow or easier injection in the case of transfer molding. In all cases, however, the relative production costs must be studied to see if its use is economically justified. Figure 10 shows equipment for the dielectric preheating of rubber.

Finishing Processes

The amount of flash or overflow that extends from the cured product, when it is taken from the mold, varies greatly with the type of molding method used. As flash removal is often one of the most costly operations in the manufacture of a molded rubber product, it is always carefully considered, both as to the method of removing and as to means of molding which will minimize the amount of flash. Furthermore, the requirements of the product and the product's function are taken into consideration to determine the allowable flash extension on finished parts.

When applicable, cold-temperature tumbling (dry ice or liquid carbon dioxide) provides one of the most satisfactory and economical means of flash removal. The part is frozen rigid, and the tumbling action breaks off the brittle thin flash extensions. There are some limitations of this process which result from: (1) flash thicknesses which are too thick to break off completely, (2) the use of rubber compounds which do not freeze rigidly, and (3) parts of such design that the tumbling or freezing action will cause excessive defective product. Equipment for low-temperature tumbling is shown in Figure 11.

Mechanized punch presses, with single or multiple dies and with conventional or rotary loading mechanisms, provide an efficient method of trimming where flash thicknesses are relatively thick, where entire mold loads are removed in a single sheet, or where holes or notches are to be put in the product.

Wire brushing by hand with conventional pedestal buffers is commonly used for removing flash from molded-to-metal parts. Automatic wire buffing, multiple spindle reaming, and other specialized types of mechanical equipment are utilized to remove flash from those products where large-volume production justifies their use. Automatic end and surface grinding of wringer rolls is shown in Figure 12, and multi-spindle reaming of battery cases in Figure 13.

Great stress is given to the flash removal problem throughout product design, customer contact, manufacturing process determination, mold design, and finishing equipment design. Herein lies a problem which often affects product cost and appearance as much as, or more than, any other single consideration.

Inspection and Testing

The newer and frequently more rigid requirements imposed on molded rubber products have resulted in the necessity of providing the means properly to inspect and test these parts to meet all the prescribed specifications.

The use of statistical quality control methods to insure proper quality levels has been adopted for some molded rubber products, but the use of these techniques has not yet been proven economically sound for the overall operations. However, despite the fact that these techniques have not been completely exploited from the finished product or operational standpoint, they are being used extensively as compound batch controls and in-process inspection.

The system of 100% inspecting and testing of finished rubber products is used universally throughout the industry.

The inspection of a molded rubber product may vary from the time necessary to pick up each item of any given lot for a quick visual inspection, in order to accept only those parts that are visibly satisfactory from an outward appearance, to the thorough inspection given an automotive vibration damper that is inspected as follows: (1) check concentricity of bore of inner metal to O. D. of outer metal to T.I.R. of 0.030-inch; (2) check bore of inner metal to plus or minus 0.002-inch; (3) check flatness of inner metal; (4) inspect for proper relative torsional deflection between inertia member and case to meet deflection of 0.080-0.095-inch under 100 foot-pound load.

The following miscellaneous operations could be used to describe typical inspection procedures for the normal wide variety of molded rubber products inspected: (1) quick visual inspection only; (2) close visual inspection, flex for adhesion and/or flow cracks or tears; (3) close visual inspection, flex for flow cracks and/or gage, as required; (4) wash and inspect during washing, flex and/or gage; (5) test for some specific functional characteristic: namely, adhesion, load-deflection rate, flow rate, sealing ability, hardness, etc.

The testing operation, shown as Item (5), could be further elaborated by referring to the actual inspection or testing performed on several specific typical molded rubber products: namely,

Fig. 10. Dielectric Preheating and Uncured Rubber

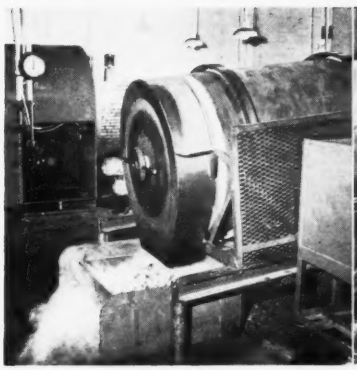


Fig. 11. Low-Temperature Tumbling

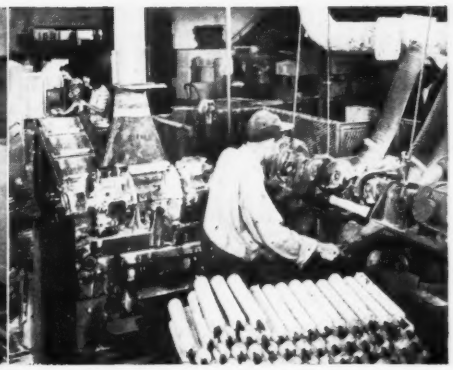


Fig. 12. Automatic End and Surface Grinding of Wringer Rolls

PRESSURE-PIPE RUBBER RINGS. Place ring on expansion pulleys and stretch each part to 100% of original circumference and visually inspect for irregular surface depressions, pits, cracks, blisters, porosity, air pockets, and necking. Revolve ring on pulleys to permit inspection of complete surface. (See Figure 14.)

AUTOMOTIVE ENGINE MOUNTS. (a) Inspect for hardness. (b) Flex mounts twice under 350-pound compressive load and check load-deflection rate to plus or minus 10% for 350-pound load at 0.062-inch deflection. (See Figure 15.) (c) Test for adhesion. (d) Gage free height to print tolerances.

HYDRAULIC BRAKE CHECK VALVE SEAT. Place molded rubber valve seat over orifice in smooth plate and inspect for air leaks through water under two-inch vacuum.

TRACTOR SEAT TORSIONAL SPRING. (a) Check 100% of pieces for adhesion in special testing machine, by flexing 220 degrees in torsion and allowing free axial movement during test. (b) Stamp inspector's number on each piece for certification.

SAFETY TUBE VALVE STEM. (a) Inspect for obvious surface defects and cracks and flex for adhesion. (b) Gage base hole with 0.090-0.095-inch plug gage. (c) Gage side hole with 0.049-0.051-inch plug gage. (d) Test on flow meter for correct air flow of 25 plus or minus 5 C.F.H.

Random sampling proceedings include periodic product dimensional checks to insure proper mold register and cavity contours. Quality checks are made to assure the use of proper load-deflection rate, adhesion, oil resistance, etc. Continuous tests are made to insure proper product performance under actual service or accelerated service conditions, for example, drum tests on farm implement tires, flex tests on air-brake diaphragms, belt tests on wringer rolls, and fatigue life tests on automotive engine mounts.

Dynamic test machines are being used to make quality control checks on production lots of automotive engine mounts. The Sonntag SFIU fatigue life tester is a machine suitable for performing these tests as a rapid quality check.

Conclusion

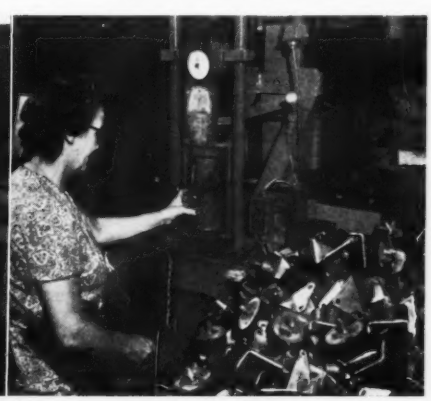
Molded rubber and rubber-and-metal products are being produced in large volume at relatively low costs to close tolerances and with wide varieties of compound characteristics. The use of molded rubber products as functional parts in all industrial fields, plus the development of varied specialized machinery and techniques used exclusively for manufacturing molded products, has made molded rubber a separate division of the rubber industry.

Rubber equipment manufacturers have developed and are producing special machinery for manufacturing molded products, and the rubber manufacturers individually have developed many special process machines for all phases of preparation, curing finishing, and inspection operations.

Fig. 13. Multi-Spindle Reaming of Battery Case

Fig. 14. Stretch Testing of Pressure-Pipe Rubber Rings

Fig. 15. Load-Deflection Rate Testing of Automotive Engine Mounts



Compounding of Silicone Rubber[1]

Arbelia C. Glime,[2] Norman A. Duke,[2] and Clinton M. Doede[2]

THIS paper describes a portion of the work on silicone rubber carried out by a research group at The Connecticut Hard Rubber Co. laboratories under government research and development contracts[3] administered by the Office of the Quartermaster General. The work was originally conceived and planned in 1948 by a Combined Services Committee on Rubber Products, The Research & Development Board, and an Advisory Committee set up by S. H. Manion, of the Research & Development Board, consisting of C. S. Fuller, N. A. Shepard, and H. L. Fisher. The work is part of the Arctic Program, with the broad objective of finding a general-purpose elastomer that will perform satisfactorily down to low sub-zero temperatures—of the order of 100° F.

Experts have expressed the opinion that a highly satisfactory answer to the problem would not be likely to be provided by a carbon skeleton elastomer because the freezing points of these compounds are too high. On the other hand, silicone compounds which are basically polymethylsiloxanes, or slightly modified polymethylsiloxanes, have very low freezing points and are inherently capable of remaining resilient and pliable at temperatures down to —120° F. All of the early silicone elastomers had extremely low tensile strengths and elongations and were characterized by rubber technologists as "factice-like materials that would stand high temperatures." A likely approach would be to attempt to produce an improved silicone rubber by compounding or other means that would result in a resilient, tough, and wear-resistant product which could serve as a general-purpose low-temperature elastomer.

Compounding studies were considered a likely possibility because much of the previous work had been directed toward either good electrical properties or high-temperature resistance. The use of carbon black would be contra-indicated in either case. Hence, it was felt that for low-temperature service the use of carbon blacks in silicones should be investigated thoroughly.

Because of the hydrophobic character of silicones, a considerable amount of work on the high-temperature, high-vacuum out-gassing was thought to be in order. Furthermore pigment pretreatment by "heat-cleaning" followed by reabsorption of other materials might well be expected to make the pigment surface more receptive or provide better adhesion between the pigment surface and the polymer.

This paper reports and describes investigations that have been carried out to test these ideas. In addition to the compounding studies mentioned above, several related studies are also reported herein. These include electron microscopic examination of pigments and compounds to determine the nature of the pigments used and the distribution of these pigments in the silicone rubber. Compounds other than the usual benzoyl peroxide have been investigated as possible replacements as curing agents in silicone rubber compounds. Several compounds have been tested as dispersing agents for use with the silicone gum-pigment system.

It is hoped that this paper will add information to the general knowledge available on the reinforcement of silicone rubber.

Standard Procedures

Milling, curing, and testing operations used were carried out in accordance with the following procedures. All compounds were milled on a Thropp three- by eight-inch laboratory mill, equipped with a scraper blade using the technique described in General Electric Technical Report CDR-60.[4] The test slabs were cured initially in an electrically heated press at 250° F. with approximately 400 pounds per square inch pressure and cured further in an electrically heated oven over a period of 48 hours, using a cycle starting at room temperature and reaching a maximum temperature of 480° F. Tensile tests were carried out with a Scott tester, Model L. P., in accordance with the specifications set forth in the ASTM Standard D412-49T.[5] Hardness tests were carried out in accordance with the conditions of the ASTM Standard D676-49T.[5]

The basic materials used for all compounding were G-E silicone rubber 9979-G[6] and Luperco AS benzoyl peroxide.[7]

Precision of Tests

In order to determine the reliability of the physical test results, 40 batches of one compound were prepared as a control. A statistical analysis of the physical test values on these batches was made with the following results:

	Minimum Value	Maximum Value	Mean Value	Probable Error %
Tensile strength, psi.	172	294	225	20
Elongation, %	75	167	120	16
Hardness, Shore A	30	57	46	4

These results indicate that small differences in the test results are not significant; for instance, in values of the tensile strength, one half of the test results should lie in the range of 205 to 245 pounds per square inch. The actual errors were further reduced by making two mixtures and testing two slabs (three strips on each) in arriving at most of the results shown throughout this paper.

Compounding of Pigments

Fifty-five materials were compounded with the silicone rubber and the curing agent, benzoyl peroxide. Various types of silica, diatomaceous earths, calcium carbonates, metal oxides, and reinforcing blacks were tested. The reinforcing blacks were included because of their superior performance in hydrocarbon rubbers, although at the present time they appear to destroy the curing action of the benzoyl peroxide in silicone rubber.

All pigments were given a preliminary test by compounding the silicone rubber with 2% of benzoyl peroxide and a 25-volume loading of the pigment. The physical test results obtained at 25-volume loadings are given

[1] Presented before the Division of Rubber Chemistry, A. C. S., Washington, D. C., Mar. 3, 1951. Later work on this subject appeared in *Ind. Eng. Chem.*, 45, 6, 1297 (1953).
[2] Connecticut Hard Rubber Co., New Haven, Conn.
[3] United States Government contracts W-44-109QM 2161 and DA-44-109-QM 64.
[4] "G-E Silicone Gum 9979-G." General Electric Co., chemical department, Pittsfield, Mass.
[5] "ASTM Standards," Part 6. American Society for Testing Materials, Philadelphia, Pa. (1949).
[6] Later known as SE-79.
[7] Lucidol division, Novadel-Agene Corp., Buffalo, N. Y.

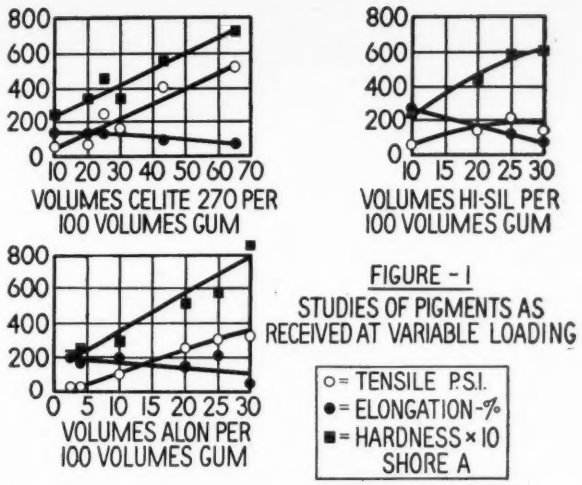


FIGURE - 1
STUDIES OF PIGMENTS AS RECEIVED AT VARIABLE LOADING

in Table 1, together with the chemical composition and particle size of the pigments. These values should be compared with values of approximately 10 pounds per square inch for tensile strength and 15% elongation obtained on rubber cured in the absence of pigment. Alon gave one of the more promising stocks with a hardness of 60, a tensile strength of 300-500 pounds per square inch, and an elongation of 225%. Hi-Sil gave compounds of comparable hardness, but with lower values of tensile strength and elongation than Alon. Another of the more promising pigments was Celite 270, from which compounds were obtained that had lower values of hardness (45 on the Shore A scale) than those obtained with the materials mentioned above; however, its values of tensile strength and elongation were equivalent to those of Hi-Sil.

The 25-volume loading does not necessarily represent the optimum loading for any given pigment. The pigments which appeared to be most promising in this preliminary survey were then compounded, using variable loadings to determine the optimum amount. Mixtures of pigments were tested in some cases. A group of representative pigments was pretreated in various ways and again compounded in 25-volume loadings. Representative results are given in Figures 1 and 2 of the effect of variable volume loadings with several pigments.

In general, as the pigment loading is increased, the effect obtained at first is one of increasing tensile strength, decreasing elongation, and increasing hardness. As the pigment loading is increased further, the tensile strength values either level off or begin to decrease.

At higher loadings the stocks containing Celite 270 were relatively hard, but at a hardness of 60 it may be seen that the tensile strength of such a compound with Celite 270 is about 400 pounds per square inch. This pigment seemed to cause high tensiles with less stiffening than other pigments tested.

The use of Alon resulted in compounds with a maximum tensile strength of 300-400 pounds per square inch with a hardness of 70. It should be noted that Alon cannot be used in loadings much above the original 25-volumes tested without encountering very high hardness and low elongation results.

The Hi-Sil and Fume Silica data revealed that tensile strengths of 200-250 pounds per square inch were obtained with 60 durometer stocks. With both these pigments the values of the elongation obtained were less than 100%.

Super Multiflex, a calcium carbonate, showed a steady increase in the tensile strength as the loading was increased, but loadings above about 40 volumes produced stocks which could not be cured properly. At this loading the tensile strength of 200 pounds per square inch along with an elongation of 300% and a hardness of 53 show that this pigment does not reinforce the rubber so strongly as do the other pigments, but the high elongation obtainable even at high loadings is interesting. The alkaline nature of this pigment may be related to its unusual behavior.

Titanium dioxide, represented by Rayox 110, yielded stocks which showed a definite maximum in values of tensile strength, but even at this maximum value of 280 pounds per square inch the compounds were inferior to those obtainable with Celite 270. As indicated above, Celite 270 seems to be the best single pigment tested by us for producing a general-purpose compound using this particular silicone rubber base (General Electric SE-79).

From these studies it may be concluded that tensile strengths of the order of 600 may be obtained easily, but the compounds are relatively hard. Stock with tensile strengths of 400 and elongations of 100-150% at a durometer hardness of 60 are relatively easily obtained.

Treatment of Pigments

One theory of the reinforcing action of carbon black in hydrocarbon rubber is that a definite chemical reaction occurs at the rubber-pigment interface. It has been further assumed that materials, such as oxygen, adsorbed on the black cause a type of cross-linkage at the interface.[8] In order to determine if an analogous reaction might improve silicone rubber stocks, several pigments were pretreated to remove adsorbed materials as completely as possible.

The pigments chosen for the pretreatment study were Micronex W-6, a reinforcing black, included because of its superior performance in hydrocarbon rubbers; Innes-Speiden Silica 1240, Celite 270, and Hi-Sil, chosen as three types of silica which differ considerably in properties. Silica 1240 and Celite 270 were selected because they have been reported to be satisfactory as reinforcing agents for silicone rubber.[4] Celite 270 is a diatomaceous earth of relatively large particle size, and Hi-Sil, one of the newer silica products, has a particle size of the same order as that of reinforcing carbon blacks.

Two methods were used for removing adsorbed materials: (a) heating at 400° C. in air and (b) heating at 1000° C. in a vacuum (10^{-4} mm. Hg) for one hour.

The results of these tests are presented in Table 2 (lines A, B, and C). It was found that neither of the treatments resulted in significant improvement in properties of the

[8] C. R. Park, *Ind. Eng. Chem.*, 31, 1402 (1934).

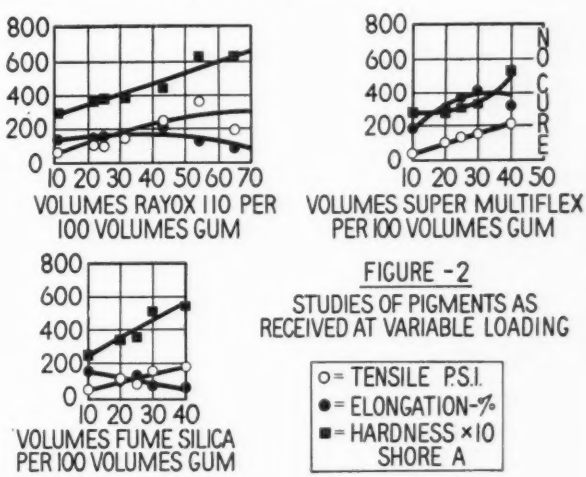


FIGURE -2
STUDIES OF PIGMENTS AS RECEIVED AT VARIABLE LOADING

TABLE 1. STUDIES OF PIGMENTS AS RECEIVED AT 25-VOLUME LOADING

Name	Composition	Average Particle Size, Microns*	Tensile Strength Psi.†	Elongation % †	Hardness (Shore A)†
Alon	Aluminum oxide	0.03	315	215	58
II	Aluminum oxide	0.005-1.0	140	180	34
Al Flake 5	Aluminum flake		30	50	67
Fine	Aluminum flake		90	250	71
Atomite	Ground calcium carbonate	2.05	70	115	40
AZO-ZZZ-55	Zinc oxide (American process lead-free)	0.2	120	160	38
66	Zinc oxide (French process lead-free)		100	140	38
Barium sulfate			50	150	31
Celite 322	Flux-calcined diatomaceous earth		445	140	39
270	Calcined diatomaceous earth	1-6	250	140	46
Snow Floss	Uncalcined diatomaceous earth	1-2	165	125	43
Super Floss	Flux calcined diatomaceous earth	2-4	180	125	40
Crown clay	Kaolin		No cure		
Dicalite No. 1	Uncalcined diatomaceous earth	2-10	120	125	40
PS	Calcined diatomaceous earth	2-6	135	150	40
SA-3	Uncalcined diatomaceous earth	2-40	240	130	52
UF	Calcined diatomaceous earth	2-40	180	150	41
White	Flux-calcined diatomaceous earth	2-6	140	165	36
Fume Silica	Silica XC54	0.01-0.03	90	140	37
Furnex	SRF Black		39	50	37
Hi-Sil	Silica	0.025	205	115	59
Hydrate AI C741	Hydrated alumina		100	160	36
Linde Silica	Silica		215	70	67
30	Siloxane-coated silica		245	90	60
Lithopone	30% zinc sulfide, 70% barium sulfate		40	290	25
Magnesium carbonate			50	175	30
Mapico Black	Iron oxide	0.2	140	120	43
Brown 418	Iron oxide		220	160	43
Crimson 88	Iron oxide	0.2-0.6	265	145	44
Red 297	Commercial pure iron oxide	0.35	85	160	35
347	99.3% ferric oxide	0.06	150	115	48
387	99.3% ferric oxide	0.06	85	120	35
Tan 20	Iron oxide	0.1-0.8	175	150	46
Yellow 100	Iron oxide	0.2	190	170	40
Dark Orange	Iron oxide	0.1-0.8	160	125	41
Michigan No. 30	Light calcined magnesium oxide		60	175	32
Micronex W-6	EPC Black	0.03	175	100	47
Monastral Blue	Phthalocyanine		No cure		
MP-561-1	Anatase titanium dioxide	0.06-0.3	140	125	42
2	Anatase titanium dioxide	0.01-0.12	165	150	44
3	Anatase titanium dioxide	0.01-0.06	110	50	55
Protox 166	Zinc oxide (American process with propionic acid)	0.35	110	250	35
Rayox 110	Rutile titanium dioxide		90	200	35
Santocel C	90% silica	3-5	115	55	66
CX	90% silica		285	60	68
Silene EF	Hydrated precipcitate calcium silicate	0.2-0.3	145	155	41
Silica 1240	Silica	5-10	95	165	35
Statex A	CF Black		155	130	40
B	FF Black		70	100	42
Sterling L	HMF Black	0.06	No cure		
Super Multiflex	Coated precipitated calcium carbonate	0.035	95	200	34
Ti Pure 510	Rutile titanium dioxide		65	165	36
Titanox RANC	94% Rutile titanium dioxide plus aluminum oxide, silicon dioxide, zinc oxide	0.35	115	150	40
RC	30% Rutile titanium dioxide 70% calcium sulfate	0.65	75	175	30
Witcarb R	Precipitated calcium carbonate	0.05	65	200	30

*The particle size was taken from manufacturer's information.
†Tensile strength, elongation, and hardness values are the average of those obtained by testing three dumbbells from each of two slabs.

TABLE 2. STUDIES OF PRETREATMENT AT 25-VOLUME LOADING*

Pretreatment†	Tensile Strength Psi.	Elongation %	Hardness (Shore A)	Tensile Strength Psi.	Elongation %	Hardness (Shore A)
	MICRONEX W-6			SILICA 1240		
A	175	100	47	100	155	37
B	‡			110	150	32
C	‡			90	140	36
D	205	175	40	55	225	18
E	245	50	66	80	125	35
F	70	100	40	70	150	32
G	‡			90	150	34
H	—	—	—	60	200	20
	CELITE 270			HI-SIL		
A	260	140	47	220	120	62
B	240	150	42	105	125	37
C	275	125	48	120	165	39
D	125	150	33	215	100	58
E	280	165	43	—	—	—
F	285	150	50	190	125	54
G	165	125	40	175	125	50
H	155	140	35	75	75	40

*2% benzoyl peroxide used in all recipes except H.
†Pretreatment Code:
A As received.
B Heating to 400° C. in air.
C Heating to 1000° C. at 10^{-4}mm. Hg.
D Heating to 400° C; silicone coated by hydrolysis.
E Heating to 1000° C; silicone coated by hydrolysis.
F Heating to 400° C; coated with silicone oil (G-E-9981LT-35).
G Heating to 400° C; coated with silicone oil (G-E-9981LT-4).
H Benzoyl peroxide coating on pigment; no other peroxide added.
‡No cure.

compounded stocks, and that in two cases (Hi-Sil and Micronex W-6) the treatments appeared to have had an adverse effect on properties.

It seemed logical that a silicone compound could act as a bonding agent between a pigment and the silicone gum, particularly in view of the fact that the silicone compound would be expected to be miscible with the gum. Therefore silicone films were applied to the surfaces of the pigments by first removing adsorbed materials from the pigments by heat, or heat and vacuum, then exposing the pigment to moist air to deposit a water film on the surface, followed by exposure of the preconditioned pigment to dimethyldichlorosilane vapor. It was thought that since the hydrolysis and polymerization occurred on the pigment surface, the silicone film might adhere strongly to the pigment and also to the gum. This type of treatment was applied to each of the four pigments preconditioned as above. When vacuum treatment was used, the silicone film was formed on the pigment surface, with special care being taken to avoid readsorbtion of air.

Another technique for coating the pigments with a silicone film involved preconditioning the pigment by heating in air to 400° C., cooling in air, then pouring a benzene solution of silicone oil over the pigment, removing the benzene by evaporation, and baking the coated pigment at 160° C.

A third technique that was tried was to wet the pigments thoroughly with a benzene solution of benzoyl peroxide, followed by evaporation of the solvent. The purpose of this treatment was to initiate the curing reaction at the pigment-rubber interface to secure a more effective bond between pigment and gum. Benzoyl peroxide was used in concentrations equal to two parts per 100 of gum. No additional benzoyl peroxide was used in the mixing.

None of the treatments with the hydrolyzed silicone films or with the silicone oils on the four pigments shown in Table 2 was promising.

Pigment Mixtures

A study of pigment mixtures as reinforcing agents for silicone rubber was undertaken because of the possibility that stocks containing mixtures might combine the desirable properties of each of several pigments. Blends of some of the more promising pigments investigated were studied at a loading of 100 parts by weight of the pigment mixture on 100 parts of gum with the normal two parts of benzoyl peroxide.

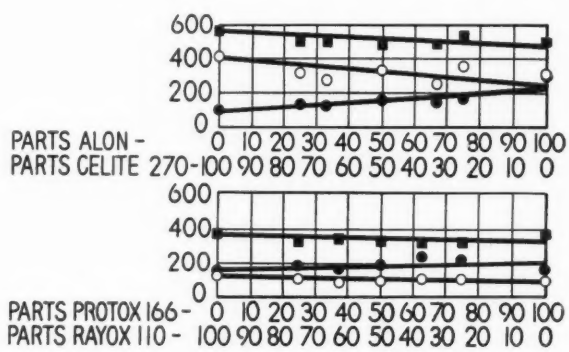


FIGURE - 3
MIXTURES OF PIGMENTS PER 100 PARTS GUM

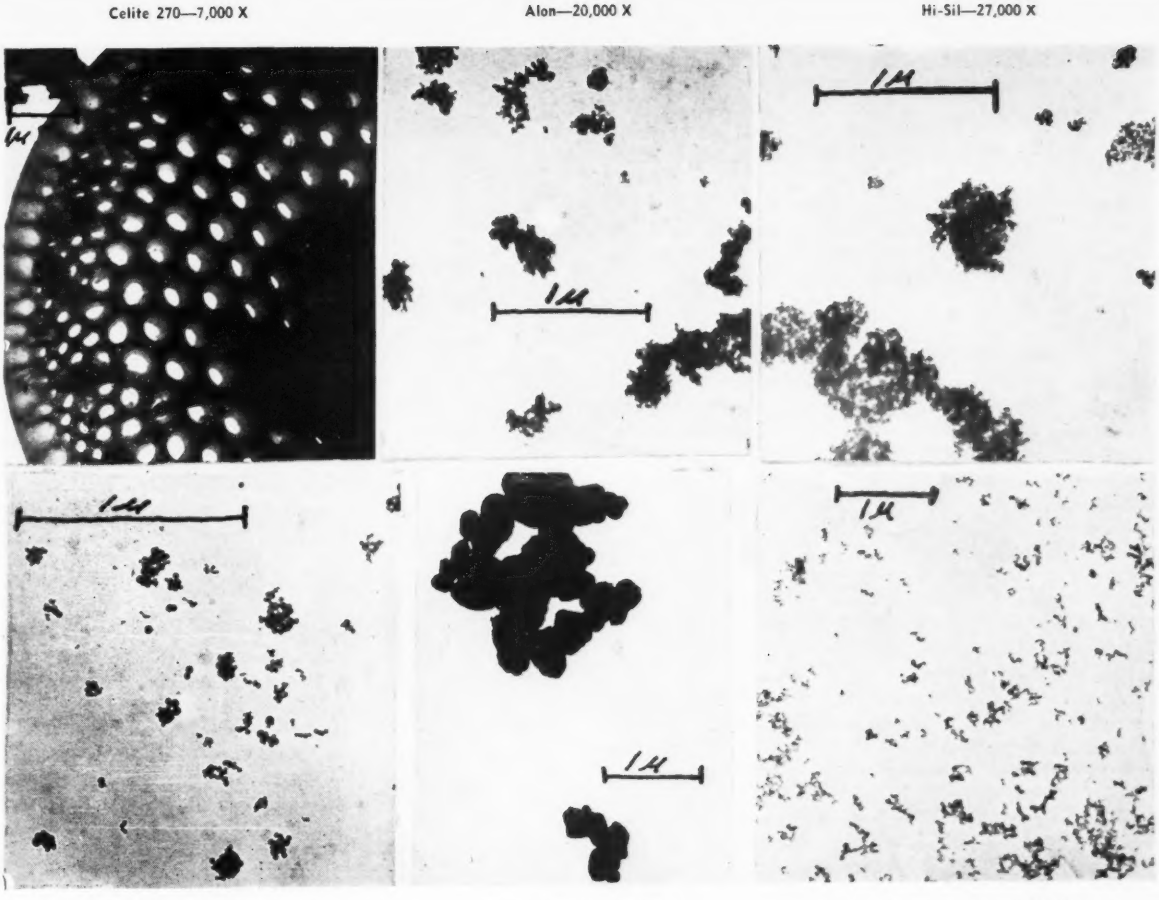


Fig. 4. Photomicrographs of Pigments Showing Chain Structure

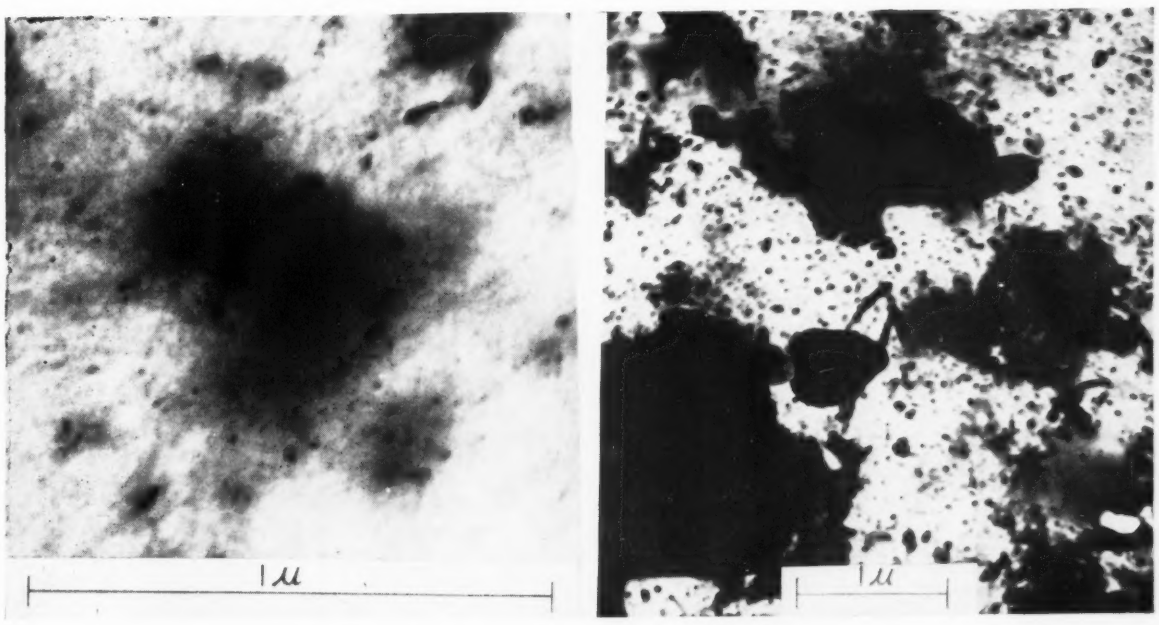


Fig. 5. Photomicrographs of Cured Rubber Specimens Indicating Agglomerates

Figure 3 shows that the hardness remained substantially constant for blends of Alon and Celite 270. The tensile strength decreased slightly as the percentage of Alon was increased, with an accompanying increase in elongation. Mixtures of Protox 166 and Rayox 110, shown in Figure 3, revealed little change in physical properties as the proportions of the two pigments were varied.

Inspection of the data shows that the properties imparted by each of the pigments are essentially additive, and it is apparent in the case of the mixtures tested that no great improvement over the use of a single pigment can be achieved.

Electron Microscope Studies

A study of the size, shape, and distribution of the pigments in the silicone rubber was undertaken to supplement and clarify the results of other experiments as well as to guide in the choice of new experiments.

Transmission photographs of the pigments were made with the pigments dispersed on a collodion film, using the technique of Ladd and Wiegand.[9] Electron micrographs of cured rubber specimens were obtained by photographing the transmission pattern of the electron beam through very thin specimens of the cured silicone rubber. These films are assumed to be representative of the bulk of the compound. The films were prepared using the vulcanization method of Ladd.[10]

Figure 4 shows photomicrographs of six representative pigments of the 20 pigments studied. Several of the photographs indicate that a chain structure may exist between particles of the pigment. This condition seems particularly true of Fume Silica. Particle size alone does not seem to account for the variance in the reinforcing properties of the pigments. Comparable compounds may be prepared with Celite 270 and Alon whose sizes differ a hundredfold. The electron micrographs of the pigments furnish evidence as to particle size and do show that agglomeration of the finely divided pigments probably occurs.

Figure 5 shows two of the smaller particle size pigments, Alon and Hi-Sil, in silicone rubber compounds. These photographs indicate that the agglomerates of pigments are not dispersed on a miscroscopic scale by the milling process. Both photographs are representative of a number taken which show that agglomeration is to be expected in silicone rubber compounds containing these pigments.

Dispersing or Wetting Agents

The modification of the pigment-rubber interface was attempted by the addition of a material to the pigment-rubber system which might be strongly adsorbed on the pigment and which would be compatible with the silicone gum. In the search for such a dispersing agent for the silicone rubber-pigment system which would be analogous to the use of stearic acid in hydrocarbon rubber-pigment systems,[11] the following compounds were tested: caprylic acid, decanol-1, dodecyl ether, dodecyl thioether, decyl mercaptan, and sodium dodecyl sulfonate. The four pigments investigated were: Micronex W-6, Silica 1240, Celite 270, and Hi-Sil. Typical results on one of these, Celite 270, are shown in Table 3.

Results show that these wetting agents caused a lowering of the hardness and a reduction of the tensile strength, with some compensation in increased elongation. It would seem that these aliphatic materials functioned more as plasticizers than as dispersing agents, imparting a softening or weakening effect. With some of the pigments the cure was completely inhibited by decyl mercaptan, caprylic acid, or dodecyl thioether.

TABLE 3. STUDIES OF ALIPHATIC COMPOUNDS AS POSSIBLE DISPERSING AGENTS IN SILICONE RUBBER-PIGMENT SYSTEMS (CELITE 270)

Dispersing Agent	Tensile Strength Psi.	Elongation %	Hardness (Shore A)
None	250	140	46
Caprylic acid	135	175	41
Decanol-1	105	240	30
Dodecyl ether	55	150	30
Thioether	55	250	32
Decyl mercaptan	65	225	25
Sodium dodecyl sulfonate	135	125	34

NOTE: Pigment loadings 25% by volume on rubber.
Aliphatic compounds were 2% by weight (on rubber) in all compounds.
Benzoyl peroxide 2% on the rubber.

Curing

The accepted method of curing silicone rubber compounds has been by the use of benzoyl peroxide in concentrations of the order of 2% by weight of the gum. Though not definitely established, it is assumed that the curing reaction involves the splitting out of two hydrogen atoms between methyl groups on adjacent silicone chains which results in cross-linking of these silicone chains.[12] As part of the investigation it was felt desirable to study the effect of varying the benzoyl peroxide concentration and to test the effect of the materials as curing agents, with the possibility of finding a material or materials which would be equivalent or superior to benzoyl peroxide.

In silicone stocks containing certain pigments a "cure" results in the absence of an agent added for curing. Specifically, silicone stocks containing 25-volume loadings of Celite 270, Hi-Sil, or Micronex W-6 occasionally show a definite cure in the absence of peroxide or other curing agents. This cure is generally far from complete. Moreover it is not easily reproducible.

The quantity of benzoyl peroxide in the compound was varied from 0 to 5% of the silicone polymer. Above a concentration of 2% the hardness increased with decreasing elongation, while the tensile strength reached an approximately constant value.

Tertiary butyl perbenzoate gave essentially the same results as the benzoyl peroxide. Di-tertiary butyl peroxide did not function as a curing agent, as evidenced by the data shown in Table 4, giving essentially the same results as obtained without the use of a curing agent.

TABLE 4. EFFECT OF CONCENTRATION OF CURING AGENTS IN COMPOUNDS CONTAINING CELITE 270

Parts Curing Agent	Tensile Strength Psi.	Elongation %	Hardness (Shore A)
CURING AGENT—BENZOYL PEROXIDE			
0	50	150	25
1	125	130	41
2	225	125	44
3	200	105	50
4	175	80	51
5	250	95	52
CURING AGENT—TERTIARY BUTYL PERBENZOATE			
0.5	45	115	24
1	140	155	32
2	135	130	31
3	195	115	42
4	195	115	35
6	205	100	46
8	255	90	52
CURING AGENT—DI-TERTIARY BUTYL PEROXIDE			
2	55	150	26
4	No cure		

NOTE: Pigment loading 25 volumes per 100 volumes of gum.

Diisopropylbenzene hydroperoxide, cumene hydroperoxide, triethylenetetramine and hexamethylene-tetramine were also investigated; the results indicate no curing action under the conditions used.

(*Continued on page 774*)

[9] *Rubber Age (N. Y.)*, 57, 299 (1945).
[10] *Ind. Eng. Chem., (Anal. Ed.)*, 16, 642 (1944).
[11] C. R. Park, V. N. Morris, *Ind. Eng. Chem.*, 27, 582 (1935).
[12] E. G. Rochow, "An Introduction to the Chemistry of the Silicones," Second Ed., p. 95. John Wiley & Sons, Inc., New York (1951).

Methods Employed in Compounding Research—X[1]

Ingredients for Compounding Research

I. Drogin[2]

THE following installment continues the section on ingredients for compounding research which was begun in our December, 1952, issue. Part I of this series appeared in our October, 1952, issue.

Vulcollans

The German synthetic-type chemical rubbers, Vulcollans, developed by Otto Bayer and collaborators in the laboratories of Farbenwerke Bayer, Leverkusen, West Germany, are, according to Weinbrenner (205),[3] Fisher (206), and Popper (207), elastomers formed by polyesterifying adipic acid and either ethylene glycol or 1,2-propylene glycol, or a mixture of the two glycols reacting or branching the polyester with a diisocyanate, 1,5-naphthalene diisocyanate, and then cross-linking or final branching (curing) by adding water, glycol, diamine, or additional isocyanate.

As a result of a recent publication by Muller, Bayer, Petersen, Pieperbrink, Schmidt, and Weinbrenner (208) on Vulcollans and their description of methods of using cross-linking agents other than water, viz., glycols and diamines, in the preparation of this chemical rubber, there are opened up new ways of processing, and in particular a solvent-free casting of Vulcollan has become possible. The authors had previously described that linear polyesters of adipic acid and simple glycols can be extended and converted simultaneously into so-called "isocyanate polyesters" with isocyanate groups at their ends by an excess of diisocyanates, in particular, 1,5-naphthalene diisocyanate. While at the time the cross-linking resulting in a plastic of rubber-like elasticity (Vulcollan) was carried out with water, the present paper deals with other cross-linking agents such as glycols, amino alcohols, diamines, and other bifunctional compounds. The authors discuss the mechanism of cross-linking for each individual case and show that the chemical nature of the cross-linking agent has a considerable influence on the properties of Vulcollan. Compared with water, glycol helps eliminate the crumb stage in the process and gives a material capable of being fabricated by casting. It is claimed that the plastic mass can also be compression molded, extruded, and calendered.

As pointed out by Watts (209), with a tensile strength, abrasion resistance, and tear strength of the highest order without further reinforcement, it is not difficult to foresee the wide field of application awaiting these rubbers once certain technical difficulties are overcome.

Vulcollan can be handled only under special conditions, is very strong, rather expensive (almost 10 times the price of GR-S), and at present is only in the pilot-plant stage. The material can be compounded with small quantities of pigments and fibers and apparently does not need carbon black for reinforcement.

The properties which make Vulcollan-type rubbers more attractive than natural rubber and GR-S are, according to Fisher (206) and Popper (207), mostly high tensile strength, excellent resistance to abrasion (without carbon black), very good tear resistance, high oxidation and aging stability due to the absence of unsaturated bonds in the polymer, and non-swelling in oil and to some extent benzene. It is claimed that Vulcollans are non-inflammable. Long exposure to acids and alkalies is detrimental; temperatures above 130° C. should be avoided, and stiffening occurs at —20° C.

Among the applications suggested for Vulcollan are (210) in heels which wear ten times longer than those from natural rubber, soling, clutch linings, friction wheels, conveyor belts, driving belts, diaphragms, sandblasting pipes, solid tires, cycle tires, cable covers, mechanical goods used in refineries and in the chemical industry, foams, sponges, and in cellular products called Moltoprenes, produced by using the CO_2 as the blowing agent.

A new polyester diisocyanate rubber product, chemically similar to the German Vulcollan, but with better all-around wearing characteristics and important processing advantages over the German product, has been developed by Goodyear. The German rubber, according to Dinsmore (211), must be molded into the finished article immediately after it is chemically composed; whereas processing of the Goodyear rubber can be delayed. The solidifying reaction of the polyester with the diisocyanate can be controlled at a point where the resultant material can be further processed on mills, calenders, extruders, and other conventional rubber equipment.

Laboratory testing has shown (212) that tire treads made from the Goodyear product have two to five times greater wear resistance than treads made of the best "cold" rubber produced. The new material also resists oxidation far better than natural rubber or GR-S; it is equivalent to butyl rubber in air diffusion resistance and is equivalent to neoprene in oil resistance, and it has tensile strength 50 to 100% greater than other types of rubber-like material. Tires made from it can be vulcanized in less than half the usual time. It can be made in any color without a decrease in utility. Carbon black and other reinforcing agents may be used, although are not required as a stock toughening material. According to Litchfield (214), laboratory tests of the new material indicate "tires made from it could easily outwear the automobile itself, and that shoe soles and heels and heavy-duty conveyor belts can be given extraordinary resistance."

The only hitch to Goodyear's rubber is cost. Quantity production of the basic materials could bring the selling price down to 65 or 75¢ a pound. This would compare

[1] Based on a paper presented before the Ontario Rubber Section, C.I.C., Toronto, Ont., Canada, Mar. 11, 1952; The Los Angeles Rubber Group, Inc., Los Angeles, Calif., Apr. 1, 1952; and the Northern California Rubber Group, San Francisco, Calif., Apr. 10, 1952.

[2] Director of research, United Carbon Co., Charleston, W. Va.

[3] Numbers in parentheses refer to Bibliography items at the end of this installment.

with 23¢ a pound for GR-S and in the neighborhood of $2 a pound for the German Vulcollan, reported by Popper (207).

Chemigum SL, a Goodyear development, is, according to Seeger, Mastin, Fauser, Farson, and Sinclair (214), an elastomeric polyester-urethane made by condensation polymerization of a low molecular weight polyester adipate with a diisocyanate. The polymer, having a molecular weight in the range of 20-50,000, is a processible raw gum which has many of the processing characteristics of pale crepe rubber. Its intrinsic viscosity ranges from 1.0-2.0; gel 0-10%.

Reclaimed Rubber

A reclaim is a devulcanized rubber product resulting from the reprocessing of waste vulcanized rubber by chemical, thermal, or mechanical treatment. The relatively large demand for reclaimed rubber is prompted both by economic and technological reasons. These, as pointed out independently by Palmer (215), Ball (216), Trimble (218), Kilbourne (218), and Thompson (219), are low uniform cost, uniform cost from year to year relative to crude rubber; lower mixing cost because of the lower power consumption (the power required for milling reclaimed rubber is, according to Thompson (219), found to be only 60% *versus* 100% for natural rubber and 130% for GR-S); shorter mixing time because part of the pigments are already dispersed; cooler running; faster extrusion; lower shrinkage; less nerve; well knitting; good flow properties on calendering and extrusion; better dimensional stability; faster cure which may be utilized to give a quick mold turnover; better aging; more uniformity and ready formulation for special uses. In a breakdown test comparison Thompson (219) has shown that natural rubber reclaim knitted in 15 seconds as against 210 seconds for natural rubber, 240 seconds for GR-S, and 90 seconds for GR-S reclaim. Natural rubber reclaim attained smoothness in 25 seconds, as against 360 seconds for natural rubber, 810 seconds for GR-S, and 215 seconds for GR-S reclaim.

The types of scrap rubber which are reclaimed are graded in accordance with the specifications for scrap rubber (220). The most important type of scrap is passenger tires (natural/GR-S) followed by truck tires (natural/GR-S); tire parts, including peels (treads stripped from pneumatic tires and free of fabric); Dykes (beadless tires from which two or more plies of fabric have been removed); S.A.G. (special auto grade); carcass (pieces containing no tread, sidewall, bead, or cushion rubber); mechanicals (black/colored); tubes (black, red, butyl); and solid tires, bicycle tires, shoes, and hose.

Premix

In recent years several reclaimers have undertaken to provide the rubber industry with a premix, i.e., fully compounded reclaim stocks containing all or most of the fillers and softeners except curing agents which have been thoroughly blended with and dispersed in the reclaim on standard straining and refining equipment. For instance, a typical standard premix (221) for molded goods comprises reclaim, 194 parts; fine calcium carbonate, 50; FEF or MAF carbon black, 20; zinc oxide, 5; fatty acid, 5; asphaltic softener, 5; and paraffin, 1. The specific gravity of the premix is 1.37; rubber hydrocarbon (RHC) by weight, 36% and by volume, 54%.

Some of the advantages claimed for a premix are that fewer compounding ingredients are required than with a conventional mix; no zinc oxide or stearic acid is needed; mixing time is less than for a conventional mix; processing is improved; production is increased; quality is improved; and the overall cost of the final article is reduced. This is the primary advantage. Premixes have already invaded the field of mats, hard rubber, and camelback. Some attempts have also been made to use them in tire stocks.

Powder Reclaim

A new kind of reclaim, which is produced by Midwest Rubber Reclaiming Co. in powder form and is free flowing and suitable for automatic handling and weighing, is the latest development in the reclaim field. The process, according to le Beau (223), permits the production of reclaim of a very wide range of plasticites, much wider than is possible by the use of the conventional reclaiming equipment. Furthermore the reclaim produced in powder form can be made to a uniform degree of reclaiming. A variety of these reclaim powders, according to le Beau, can thus be produced. They are usually, but not necessarily, prepared in premix form and will produce pliable, coherent sheets on milling equipment. The particle size can be varied considerably.

Reclaim powders, according to le Beau, also seem to mix cooler than conventional reclaims and also mix faster on the first pass. Power consumption is decreased. Compounding batch sizes could also be increased for an internal mixing machine of given volume. The physical properties of reclaim powders compare favorably with those of conventional reclaims. In laboratory mixing, the reclaim powder showed by far the least increase in temperature at any given mix milling time and, consequently, seems to be the material having the best carbon black dispersion. Reclaim powders, according to le Beau, appear to possess improved dispersibility in the compound. The results obtained with the reclaim powder containing carbon black indicate advantages in the dispersion of the black, which advantages did not appear to be realized by the use of conventional reclaims. The carbon black, if present, appeared to have been adsorbed on to the surface of the individual reclaim particles. This action occurs during the actual reclaiming process and is visually demonstrated.

Reclaiming Processes

The following reclaiming processes are of commercial interest: the digester or wet process; heater or pan or open steam process; high-pressure steam, also known as the Palmer "gun" process; Reclaimator, or the "Dip process" (223); Lancaster-Banbury (224); acid; Boston Woven Hose; Uniblend; and Dasher[4] processes. Several of these processes were discussed at the Akron Rubber Group Panel Discussion on Reclaimed Rubber (225) on February 1, 1952. Manufacturing processes, blending, and refining operations are also covered in detail by Ball (226) and Hader and le Beau (227). Some of the aspects of reclaiming GR-S are presented by Gillman (228).

The main steps in reclaiming rubber by the wet process are grinding and shredding the tires through cracker rolls and fine grinding rolls, sifting, demetallizing, devulcanizing, blow down, dewatering, drying, compounding, blending, rough refining, straining, and finish refining. A large percentage of tires is reclaimed whole. The tires are cut into coarse sections and fed directly into heavy-duty cracking rolls operating in a closed system with screens as well as magnets for removal (demetallizing) of the bead wire and tramp (picked up) metal such as nails, etc.

Defibered scrap is required in the reclaiming by the

[4] Dasher Rubber & Chemical Co., Fairport Harbor, O. Patents pending.

pan or open steam process, the Reclaimator or "Dip process," and the Lancaster-Banbury process. The high-pressure (Palmer "gun") process does not require defibered scrap. The devulcanized scrap from these processes is subjected to the same refining operations as used for wet process reclaim. The use of fiber-free rubber for reclaim is discussed by Dorris (*229*), who enumerates, respectively, nine advantages applying to all reclaiming procedures, five relating to digestion procedures, and eight favoring newer procedures. Irrespective of the method of devulcanizing, the starting point is ground scrap.

According to O'Conner (230) and to Hader and le Beau (*227*), the chemicals generally used as reclaiming agents are aliphatic and aromatic mercaptans; aliphatic and aromatic monosulfides and disulfides; amino compounds, unsaturated hydrocarbons such as terpenes, especially terpinolene, unsaturated ketones, including phorone; a butyraldehyde-aniline condensation product; crude solvent naphtha and certain unsaturated compounds obtained as by-products from coke oven operations, coal tars, pine tar oil, and various unsaturated and other nitrogen compounds and sulfur compounds.

GR-S, according to Gillman (*228*), does not respond to reclaiming agents in the same manner as natural rubber. The predominating difference is that it will not revert on heating in the presence of oxygen; instead it stiffens, becomes harder and drier. Very few chemical peptizers for GR-S are known, and these are not too effective. To solve this problem partially, the reclaiming industry has resorted to the use of penetrating solvents and mechanical disintegration. By the use of large amounts of plasticizers with a minimum of heat treatment followed by sufficient refining, the structure of GR-S vulcanizates may be broken down.

Cook, Albert, Kilbourne, and Smith (231) have pointed out that certain polyalkyl phenol sulfides are effective in small quantities as reclaiming agents or catalysts for the reclaiming of various vulcanized synthetic rubber scraps. Their use in the correct proportions, together with the proper swelling agents and tackifiers has resulted in the production of reclaims from GR-S and other synthetic elastomers which compare favorably with natural rubber reclaim in processibility and compatibility, and in both cured and uncured physical properties.

Blending. The devulcanized rubber polymers coming from the driers are transferred to a mill or an internal mixer where various types of scrap may be blended, and plasticizers, such as asphaltic materials, and appropriate fillers, such as carbon black (*2-2½* parts), clay, and whiting, are added and blended. The amount of these additives is kept as low as possible so as not to increase the gravity of the reclaim.

Refining. The blended stock is now refined in order to process efficiently in the ultimate manufacture of rubber goods. The procedure is to pass the stock between mill rolls set with a very small clearance. The refining operation consists of a preliminary refining (breaking), generally followed by straining and then by final refining on finishing mills. In breaking or the preliminary refining, the stock is passed through two short sturdy refining roll mills, which, according to Taylor (*232*), have short rolls that are rather large in diameter as compared to length and are also accurately "crowned" to compensate for bending. The two rolls of a refiner are of different diameter. Like the mills, the refiners are supplied in a number of sizes that fulfill a wide range of requirements. A 21-inch roll will have a crown better than 0.006-inch, and a 24-inch roll 0.003-inch measured on the diameter. The rolls generally operate at 40 r.p.m., and at this speed the larger roll has a peripheral speed of 254 feet per minute. The friction ratio of the rolls is about 2.5:1. In the most modern-type drive for refiner mills in which all drive and connecting gears are encased and the rolls are driven through universal couplings, it is possible to design them to give roll friction ratios of 3:1 or even higher. All rolls are chilled and possess hard smooth surfaces. The machines are equipped with a fixed scrapper on the back roll and a batch-off roll to wind up the plies of 0.003- to 0.004-inch refined stock. The mill rolls are set with a very small clearance and thus exert a high pressure on the rubber during mastication. In the refining operation the tough unsoftened particles are held back or are forced to the side of the rolls.

Any partially digested particles and unsoftened pieces are left behind in the bite of the rolls and are gradually worked to the edges of the mill and are periodically removed as "tailings." These amount to about 3% of the total stock processed and are usually returned to the process for reworking. The softened scrap feeds through the rolls, and the refined sheet is taken off the fast roll with a scraper knife and is approximately from 0.0010- to 0.0012-inch thick.

Straining. In straining, generally the second step in the refining operation, bundles of stock from the preliminary refiner are fed into a strainer, which resembles a huge meat grinder. There the stock is forced through tiny holes in a screen to remove any remaining foreign material and last traces of metal. The openings in these screens may vary in diameter from 0.0115 to as much as 0.060-inch, depending on the use to which the end-product is to be put. The screens are reinforced by a perforated heavy plate. The perforations are about 0.25-inch in diameter. The strained rubber leaves the reinforced plate as a mass of continuous plastic rods, which are automatically sheared off at short intervals by rotating knives and conveyed to the finishing (refining) mills for a final refining operation.

These mills are exactly like the preliminary refiners, but here the rolls are set much closer together for the finishing operation, and the product is again squeezed and worked into a sheet with a thickness of 0.003- to 0.005-inch. This sheet is wound up on a "windup" roll until it forms a hollow cylinder with a wall thickness of approximately one inch. This cylinder is then cut from the roll lengthwise, dusted, and piled for shipment. It is to be noted that the more cracking and grinding to which the scrap material is subjected, the less refining is required.

Loading. Though the finished reclaim already carries most of the loading of the parent scrap material, a certain amount of loading of reclaim, except for frictioning, is still required for good processing. Carbon black is used by practically every reclaimer since even the smallest percentage used helps improve the processibility of the reclaim. Amounts included vary from 2% to 20%, depending upon the specific application of the reclaim compound. In addition to carbon black, clay and whiting are also used. Some prefer to add HMF carbon black, for faster cure; others prefer EPC black, to obtain better ultimate tensile; and still others prefer to add SRF black, to avail themselves of savings in cost. There is no established standard to be applied either for the types or the amount of black to be loaded in reclaim, since this amount varies with the reclaimer and with the specific reclaim compound.

THE DIGESTER PROCESS, ALSO KNOWN AS THE WET PROCESS. A comprehensive description of this process is given by Ball (226) and Hader and le Beau (*227*). In brief, the process is as follows. Ground scrap, chiefly

whole tire, is mixed with a dilute alkali solution, approximately 4-8% in strength, or a dilute zinc chloride solution, ordinarily 1% or less in strength, and reclaiming oils such as pine tar oil, coal-tar derivatives, and asphaltic products. The mix is then digested from 8-24 hours at steam pressures of 160 to 350 psi. (364-433° F.), in steam-jacketed agitator-equipped autoclaves holding up to six tons of ground scrap. The digestion with caustic soda or zinc chloride removes the fabric while the heat and oils soften the scrap. After digestion, the defibered, devulcanized stock is blown through a cyclone into a blowdown or magazine tank (washtank), and washed nearly free of caustic and decomposed fabric. The stock is then conveyed through a washing machine to complete the removal of soluble residue. The wet stock is then dewatered in a wringer-type dewatering press and then conveyed to a dryer, where the moisture content in the stock is reduced to 3-6%. The reclaim is then ready for refining. The steps through which the reclaim is subsequently put involve compounding, blending, rough refining, straining, and final refining.

THE HEATER, PAN, OR OPEN STEAM PROCESS. A detailed description of this process is given also by Ball (*226*) and Hader and le Beau (*227*). This process is usually applied to ground scraps free of fabric. Fabric-bearing scraps can be used, however, when the finished product may contain dispersed cellulose. The scrap is ground to about pea size or finer (i.e., to about 30 mesh) and is then intimately blended with the necessary reclaiming agents and then placed in open "boats" (shallow pans), which is turn are stacked on small flat cars on rails and rolled into the heater or devulcanizer—a cylindrical horizontal single-shell pressure vessel. Seven to twelve thousand pounds may be reclaimed at one time, depending on the size of the devulcanizer. Live steam at pressures from 100-300 psi. is applied for four to six hours to soften the rubber and decompose any cellulose present. After this treatment, the pressure is released, and the pans with the softened scrap are removed to the mill room. After drying in the air for several hours, the "cakes" of devulcanized rubber are ready for final working, i.e., compounding, blending, and refining.

As pointed out by Ball (*226*), the popularity of the pan process is based on the fact that the equipment is simple, that both washing and drying are eliminated, and that there is a yield of nearly 100% as most of the oils are reclaimed in the final product. The oils chosen have high boiling points and are, therefore, not lost by distillation.

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(*To be continued*)

[3] Abstract.

Silicone Rubber

(*Continued from page 770*)

Summary

The objective of this investigation was to explore means by which the currently available silicone elastomers (1948-1950) could be compounded. Of the 55 pigments used in compounds, Alon and Celite 270 seemed to give better tensile strength and elongation characteristics without undue hardening of the compound. Pigment mixtures yielded cured stocks whose properties were found to be almost straight-line functions of the mixture composition.

Pretreating by heat and/or vacuum to remove materials adsorbed on the pigments had no beneficial effect on the physical properties of the cured stocks. Coating of the pigments with silicone films did not improve the physical properties. Benzoyl peroxide coatings on the pigment surface to promote curing at the pigment surface failed to show improvement over stocks with the benzoyl peroxide added to the bulk of the rubber.

Electron micrographs furnished supporting information on the particle size and distribution of the pigments in the silicone matrix, indicating that pigment agglomeration is the rule rather than the exception.

Aliphatic compounds, investigated as possible wetting agents for silicone rubber-pigment systems, appeared to function as plasticizers rather than wetting agents.

Increasing the concentration of benzoyl peroxide beyond 2% on the gum was found to result in little change in tensile strength, decreased elongations, and increased hardness.

Acknowledgment

The authors wish to express their appreciation for the contributions of others in this work; particularly, B. J. Humphrey, C. A. Walker, H. A. Fairbank, Miss L. M. Corbo, and D. S. Moffitt. They also acknowledge permission of The Connecticut Hard Rubber Co. and the Office of The Quartermaster General to publish this work.

"Aero Brand Rubbermaker's Sulfurs." American Cyanamid Co., Bound Brook, N. J. 4 pages. The general chemical and physical properties, special characteristics, specifications, and analytical test methods for this product are given in this catalog insert.

Editorials

More on the Future of Synthetic Rubber Research

CONTINUING with the replies received from research directors and others in the rubber industry regarding the future of research on synthetic rubber, which we began with the July editorial, it becomes evident that most of these men agree that there is a need of more and better research of the basic or fundamental type, but differ as to how and by whom this research should be done.

Reply Number Two from the research director of another large rubber company states:

"Commenting on your letter of June 18, and your editorial dealing with the relation of basic to applied research, it is my conviction that throughout the history of this country we have steadily grown and prospered by the application of knowledge from fundamental research, most of which basic knowledge came to us from the work of scientists of other lands. Ours has been chiefly an engineering economy through which we have become the envy of the world in production and performance of products, including rubber.

"Some few universities, research institutes and industries have recognized and become concerned about the hazards of inheriting or appropriating most of our basic research information from the outside. I am sure that Government had had no concern about research whatsoever until it was brought face to face with some emergency, at which time overnight solution of very difficult long-range problems was expected.

"This happened in rubber, atomic energy, high octane fuels, and a variety of other problems. One can visualize how the United States would have fared in World War II had not fundamental research on these problems been done many years in advance by universities and private institutions, without a cent of federal tax money. In the case of rubber, after Government entered the research picture and appropriated millions of dollars, part of which was expended for fundamental studies, where are we? It is still GR-S from butadiene and styrene, Redox catalysts, cold rubber, butyl rubber, and the nitriles, all of which was delivered to the Government, without charge, by private industry. The only real progress which has been made toward better rubbers has come about since industry has been unrestrained in its research efforts, and incentive has again been restored."

Reply Number Three from the research director of a smaller rubber company suggested the formation of American Rubber Consumers Council to be financed by a tax on each ton of rubber consumed to supply future basic knowledge on rubber.

"These comments of mine which you suggested might be of interest to India RUBBER WORLD are not so much specific thoughts on the imminent Government-Industry Synthetic Rubber Facility Transfer and its attendant development program problem as they are about the overall scientific aspects of the Rubber Industry as they undoubtedly affect its future.

"The general-purpose synthetic rubber today could be vastly superior to natural rubber, and our nation could be free of imported stockpiles if some basic knowledge, now possible, were available to scientists associated with the rubber industry.

"The initial national rubber crash program established a decade and a half ago resulted in one of the greatest technological accomplishments the world has witnessed. It was built on borrowing. It borrowed acetylene chemistry from Notre Dame, and polysulfide knowledge from an expected anti-freeze experiment. It took the butadiene-styrene and butadiene-acrylonitrile polymers from Germany to give the nation automotive transportation and regular air travel. The recent isocyanate German polymers will give us much better footwear; and the British work on polysiloxanes has made it possible to produce an entirely new group of thermally stable rubbers.

"There is little basic knowledge left to borrow. The American rubber industry will henceforth need not only to contribute its own requirements, but it is obligated to add to that which it has already used.

"A voluntarily established industrially supported nonprofit organization whose sole function was the dissemination of knowledge could be easily organized. The Rubber Research Institute of the British Rubber Producers Association is an outstanding example of such an arrangement. An American Rubber Consumers Council, financed with a few dollars per ton of rubber consumed, could support an establishment charged with such basic and simple questions as what is rubber, how can the chemical plant duplicate biosyntheses, is vulvanization necessary, why do rubbers grow old, and is pigmentation necessary?

"These few millions a year, administered neither by government nor industry, but by a nationally representative board, could supply the knowledge needed so badly by the rubber industry.

"The small amount of money would in no way interfere with that being spent on extensive applied science and development now supported by individual industry and government.

"A source of basic knowledge like this would make it possible for the rubber industry to continue its excellent job of application and development."

We have several more interesting replies yet to come. What do you think?

R. G. Seaman

DEPARTMENT OF
PLASTICS TECHNOLOGY

Engineering Design for Rubber-Phenolics[1]

A. P. Landall[2]

ANY engineering treatment of a material necessitates some discussion of properties. While these properties have appeared in the literature, it would be desirable to point up the differences between the rubber-phenolics and the more conventional phenolic materials.

Rubber-phenolics filled with wood flour show a lower modulus of elasticity than conventional phenolics which accounts in large part for the unique properties of these materials. Impact strength, although higher than that of the conventional counterparts, is not so great as might be expected. The izod test does not show the true impact strength of rubber-phenolic, but its superiority to conventional phenolics is evident in the drop impact test. The fatigue impact of rubber-phenolic appears to be five times that of straight phenolics. This 5:1 ratio has been borne out by many practical applications. The same general relation holds between rubber-phenolics made with fillers other than wood flour and their conventional counterparts.

[1] Presented before national technical conference, Society of Plastics Engineers, Inc., Boston, Mass., Jan. 22, 1953.
[2] Chemical materials department, General Electric Co., Pittsfield, Mass.

Design and Molding Considerations

Mold Shrinkage

Normal general-purpose phenolic material is generally considered to have a mold shrinkage for design purposes of 0.007-0.008-inch per inch. The rubber-phenolics should be designed for a shrinkage of 0.009-0.010-inch per inch. This difference of 0.002-inch is exhibited across the board for all rubber-phenolics. While not completely

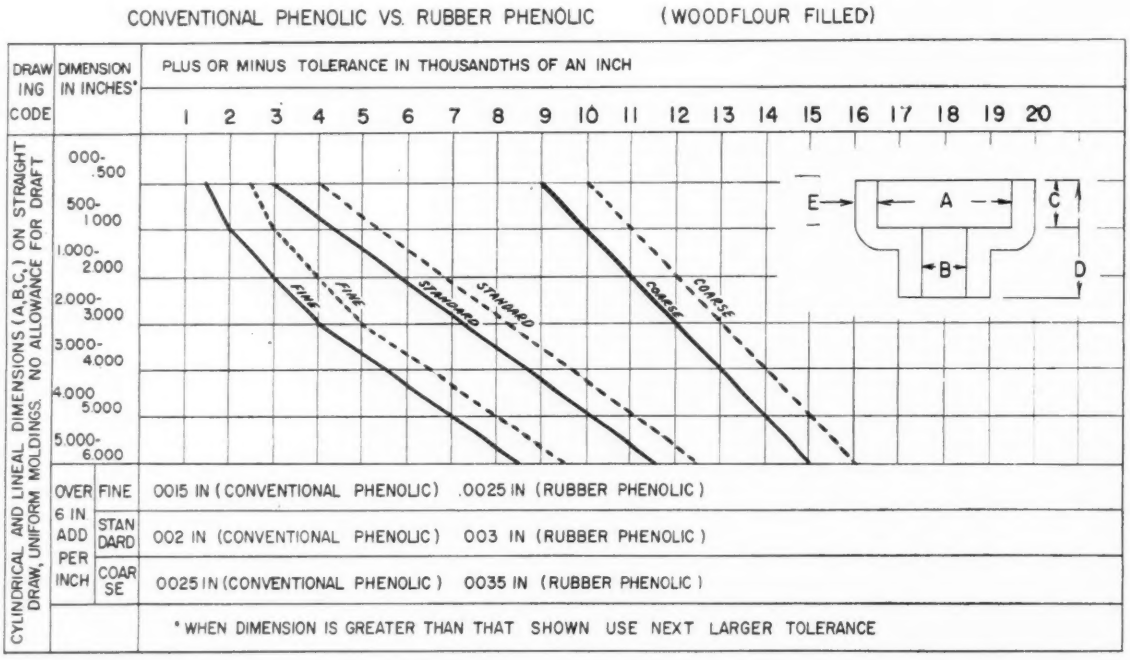

Fig. 1. Comparison of Dimensional Tolerances for Rubber-Phenolics *(Dotted Lines)* and Conventional Phenolics *(Unbroken Lines)*

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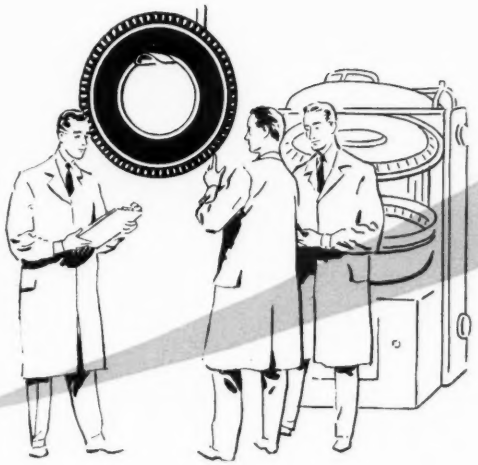

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borne out by a study of the available data sheets, this difference is the result of experience gained in the field.

This does not mean that rubber-phenolics cannot be used in molds originally designed for other materials, but rather that the tolerances should be broader. Molds already in use for other materials have been used successfully for rubber-phenolics but, by and large, these have been jobs where the dimensional tolerances were not too critical.

Dimensional Tolerances

The SPI dimensional tolerance chart (see Figure 1) shows the tolerances which can be expected with conventional wood-flour filled phenolic and its rubber modified counterpart. In general, the tolerances that can be expected with the rubber-phenolics are ±0.001-inch greater than with the conventional phenolics. These data have been borne out by many jobs in a variety of molding shops, and we believe that these tolerances can be held.

It should be remembered that we are dealing with a new material, and that some of the older handling and molding techniques may have to be modified to obtain these tolerances. For example, since this material is quite rubbery as discharged from the mold, the need of shrink forms, weights, etc., is far greater than with conventional phenolics. More care must be exercised if the part is to be kept within maximum tolerances.

General Electric has advised larger knock-out pins and the use of as many pins as practical in the design of molds for rubber-phenolics. Because of the rubbery discharge the chance for distortion is somewhat greater, and considerable design study is required to overcome this problem.

Mold Design

In the design of molds for rubber-phenolics we normally advise that an allowance of ½ degree per side be used for draft, and that undercuts and dead-end pockets be avoided wherever possible. This latter factor is particularly important because of the vulcanizing system needed to cure the rubber portion of the compound. Rubber-phenolics are somewhat more gassy than their conventional counterparts and, therefore, need some means of eliminating the excessive gas formed during the molding operation. It is generally recommended that flash vents or bleeders be provided at the parting line. In addition, flash vents should be provided along the knock-out pins, particularly those pins in sections where gas might be trapped.

Mold Surface

The surface of the mold is quite important in the successful molding of rubber-phenolics. It is recommended that a highly polished surface be used, and it is advisable to chrome plate the surface. Proper selection of the plater is important because a spongy chrome job is no better than no chrome at all.

If molded-in holes are to be used, it is recommended that the pins making these holes be draw polished rather than polished by any method that tends to leave marks or scratches at right angles to the axis of the pin. This condition is necessary to avoid any possibility of binding during the ejection of the part from the mold.

Warpage

Warpage particularly plagues those who would successfully mold rubber-phenolics. The following suggestions may be used to minimize the effects of warpage:

(1) Check pressure and reduce if possible.
(2) Check gates and relocate if necessary.
(3) Check closing speed and slow down as much as possible.
(4) Check ejection conditions.
(5) Relocate or enlarge knock-out pins if indicated.
(6) Check for possible binding or cocking action.
(7) Check curing time and increase if necessary.
(8) Check cooling fixtures or provide fixture.

It is my belief that more warpage is caused by careless handling than by any other single reason. Very frequently all that is required to minimize warpage is to place a proper sized weight on top of the molded part until it is sufficiently cooled to handle satisfactorily.

Molding Conditions

Rubber-phenolics have a very long duration of flow and are capable of exceedingly long draw applications. The use of reinforcing ribs is not as essential as with standard wood-flour filled phenolics, but, should they be desired, there is no problem in the design or molding of these ribs and bosses.

The rubber-phenolics can be molded in any conventional-type mold. In compression molding it is advisable to use positive or semi-positive molds in order to obtain as much back pressure as possible. The design of transfer molds can follow conventional lines, but runners and gates should be placed properly to insure even filling of the cavity.

For general molding of rubber-phenolic materials, we would suggest a minimum temperature of 300° F. and a maximum of 350° F. In general, the best operating range is 310-330° F., and field experience has shown this range to give parts with better appearance and less staining.

Suggested molding pressure ranges are 1-3 tons per square inch, based on projected area, for compression molding, and 2.5-4.5 tons per square inch, based on pot area, for transfer or plunger molding. It is recommended that the molder use the least pressure required to obtain a satisfactorily dense part because the rubber-phenolics, like some thermoplastics, have some tendency to pack in the mold owing to their resilient nature. Overpressure and resultant packing may cause excessive staining and sticking, as well as warpage and dimensional instability. This is particularly noticeable on transfer jogs where the springing back of parts molded under excessive pressure will cause distortion after removal from the mold.

A uniform, slow rate of transfer into the cavity at minimum pressure would constitute ideal conditions for transfer molding. This would permit ready escape of gas and tend to minimize the packing effect. Slow closing is also recommended for compression molding, and, of course, gassing or breathing is advisable wherever indicated by the design of the part. As with standard phenolics, preheating helps reduce cure time. It is recommended that electronic preheating be used, and a long preheat at low amperage gives the best results by providing a longer duration of flow and by helping to remove gas. We consider the optimum preform temperature to be about 280° F., or just below the smoking point.

Application Data

The following section discusses several typical applications of molded rubber-phenolic parts, with information as to methods of molding.

Dishwasher Parts

The impeller and silverware basket for an automatic dishwasher are shown in Figure 2. The impeller is made in a single cavity, landed plunger mold normally run at a total pressure of approximately 20 tons. Electronic

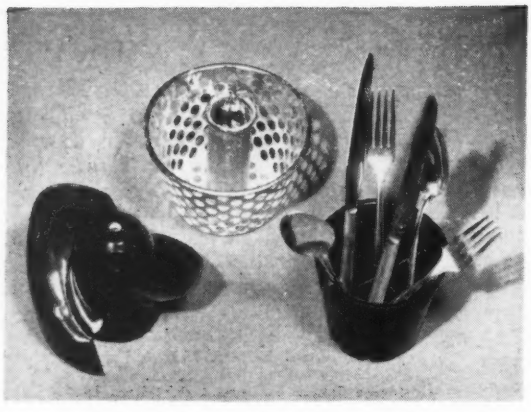


Fig. 2. Rubber-Phenolic Parts for Automatic Dishwasher Include Impeller *(Left)* and Silverware Basket *(Right)*

preheating is used, and the part cured in three minutes at a mold temperature of 340° F. In order to remove gas from some of the dead pockets it was found necessary to turn the mold upside down and employ a gassing cycle. The rubber-phenolic impeller replaced an impeller made of conventional phenolic, which was subject to considerable breakage when silverware was inadvertently dropped on to the impeller blades. Tests have shown the asbestos-filled rubber-phenolic impeller to withstand the dropping of a weight from a height at least five times greater than does the conventional impeller.

The silverware basket is also molded from asbestos-filled rubber-phenolic in a three-cavity, semi-positive mold at a pressure of 65 tons. Mold temperatures are 330° F. at the force and 350° F. at the cavity. Gassing is not required, and the part is molded on an overall cycle of two minutes.

Timer Housing

Figure 3 shows an X-ray timer which is transfer molded in a 350-ton press. This timer housing is made in a two-cavity composite so that front and back portions of the housing are molded at the same time. A 5/16-inch diameter semi-round gate is used with a 3½-inch long runner, and the mold temperature is 330° F. Preforms are preheated dielectrically for 60 seconds to a pill temperature of approximately 250° F. The plunger takes 12 seconds to close, and the part requires a three-minute cure. The finished part has a very good glossy finish and, because of the shock resistant nature of the wood-flour filled rubber-phenolic compound, shows minimum breakage in service.

Fig. 3. Typical Molded Rubber-Phenolic Parts: *(Left)* Motor Sheave; *(Center Top)* Autoclave Hand-Wheel; and *(Bottom Center and Left)* Sections of X-Ray Timer Housing

Motor Sheave

The motor sheave shown also in Figure 3 is used as the drive pulley on a generator test bench. Formerly machined from low carbon steel, the sheave is now made from flock-filled rubber-phenolic and molded in a single-cavity, landed plunger, split compression mold vented at the bottom across the split. The mold, designed to a shrinkage of 0.015-inch per inch, is reported to give the dimensions required. The part is molded in a 100-ton press reduced to give 50-60 tons' pressure, and the mold temperatures are 310° F. at the plunger and 320° F. at the cavity. The material is powder loaded and preheated for five minutes under infrared lamps, and the cure time is 3½ minutes.

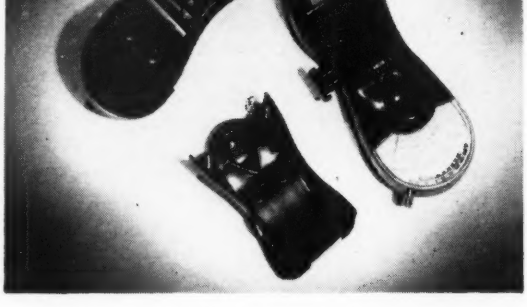


Fig. 4. Sections Molded of Rubber-Phenolic for Clamp-Type Voltmeter Housing

A shrink plug is used on the bore to reduce warpage. The part is held to a concentricity of ±0.005-inch on the outside edge of the V-groove. This sheave is four inches in diameter, two inches thick, and has three different sized grooves to accommodate different-shape pulley belts. There are two 10-24 tapped holes, and the 3/16-inch key way is molded in. In addition to being cheaper than machined steel sheaves, the molded sheaves give better performance because of more uniform density and, because of their lower mass, give reduced vibration from centrifugal force.

Autoclave Wheel

The autoclave hand-wheel, shown also in Figure 3, is molded of wood-flour filled rubber-phenolic in a single-cavity transfer mold at 70 tons' pressure. Based on a five- by three-inch pot, this is a pressure of 4.6 tons per square inch, and it was found that higher pressures resulted in cracking. The mold design is such that the material sprues directly into the mold at three places. The mold temperature is 340° F.; the three pills, each approximately 2½ by five by one inch, are dielectrically preheated; and the cure requires five to six minutes.

It is interesting to note that the center metal insert weighs 2½ pounds and is 3½ inches in diameter. There is only ¼-inch of material anchoring the insert, and there is no metal in the spokes or rim of the wheel. The insert

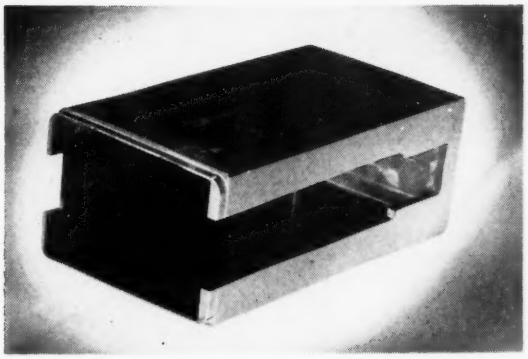


Fig. 5. Transformer Can Molded of Rubber-Phenolic

is placed into the mold while cold. Only with rubber-phenolics could such a molding procedure be used without excessive cracking of the part.

Voltmeter Housing

The clamp-type voltmeter housing shown in Figure 4 is made in a two-cavity combination-type transfer mold so that front and back sections are molded at the same time. The parts are made in a 10-inch ram press at a line pressure of 2,800 pounds. The pot diameter is six inches so that the molding pressure, based on pot area, is 3.8 tons per square inch. The gate is $\frac{1}{8}$-inch in diameter and sprues directly into the part. Mold temperature is 330-340° F. The charge consists of two pills, with a total weight of 160 grams, which are preheated for 28 seconds to a temperature of 270° F. The mold closing time is one second, and the parts cure in three minutes.

Upon extraction from the mold, the parts are immediately clamped into shrink forms and cooled in water. The housing must be light, rugged, and have good appearance; these requirements are met by wood-flour filled rubber-phenolic. General-purpose phenolics proved to be weak; while conventional flock-filled phenolics were not rugged enough.

Transformer Can

One of the larger rubber-phenolic parts being molded currently is shown in Figure 5. This part is a transformer can molded from wood-flour filled material. Despite the fact that the mold was originally designed for rag stock, filled-out parts are obtained because of the extremely long draw; while conventional phenolics are unsuitable for the application because they are too weak.

Since the center line of the plunger must be held within ±0.015-inch, the back-up plate of the mold is three times normal thickness to prevent plunger shifting. The part is made in a single-cavity positive mold with a stripper plate for ejection. Dielectric preheating is used, and the part cured in four minutes at a pressure of 250 tons. Part dimensions are held to a tolerance of $\pm\frac{1}{32}$-inch.

Lawnmower Wheels

Lawnmower wheels (see Figure 6) are being molded experimentally in a single-cavity, semi-positive compression mold using a 300-ton press reduced to 150 tons. The mold temperature is 340° F., and the charge, approximately 660 grams in pill form, is preheated dielectrically to a temperature of 200° F. The mold is gassed two seconds after closing, and the part cured for 2¼ minutes. The rubber-phenolic wheel runs more quietly and gives longer service than the die-cast aluminum wheel it replaced.

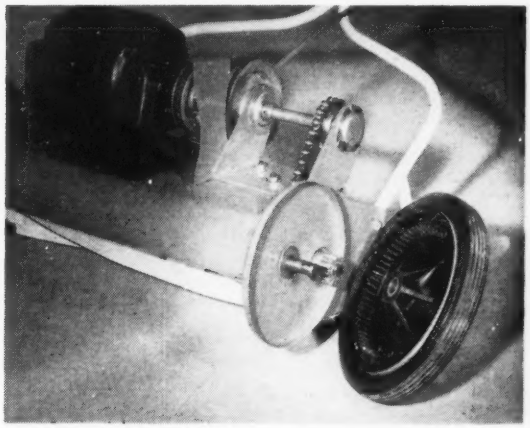


Fig. 6. Molded Rubber-Phenolic Wheel for Lawnmower

Summary and Conclusions

This paper discusses the design concepts necessary for proper use of rubber-phenolic materials, and illustrates these concepts by describing applications and molding methods. The product story on these applications is discussed so as to indicate the types of jobs which can be molded satisfactorily in rubber-phenolics, the economics of each job, and the advantages of these materials over those previously used for the applications.

New Insulating Plastic Coating

A PLASTIC coating for use as both protection and color identification on insulated lines and equipment has been developed by Armstrong Cork Co., Lancaster, Pa. The new finish, called Insulcolor, can be applied by either spray gun or brush on cork and other heat insulators. This finish is claimed to be capable of withstanding temperatures up to 160° F. without cracking, shrinking, or crazing. Available in seven colors including white, each gallon of Insulcolor should cover 35-50 square feet of surface with two coats of the finish.

New Felt Adhesive

THE Adhesive Products Corp., New York, N. Y., has developed a new adhesive, Felt-Grip, for applying felt to wood, metal, plastics, and ceramic surfaces. Claimed to be fast drying with a quick grab, the material is classed as a solvent-type cement and provides a waterproof bond between components. It may be applied by brush, spray, or machine. The following properties are reported for the adhesive: total solids content, 60%; viscosity, 10,000 centipoises; and weight, 7.8 pounds per gallon.

Foam Polyethylene Insulation

THE Anaconda Wire & Cable Co., Hastings-on-Hudson, N. Y., has introduced a new all-weather, all-channel UHF-VHF electrical line which consists of two conductors accurately spaced and firmly enclosed within foamed polyethylene. Known as ATV-270 Foam, the line claims the properties of low power loss, good resistance to weather, sunlight, and abrasion, and ease of termination. This latter feature, requiring only a penknife and a skilled hand to bare the wire for attachment to the antenna, is said to make the product unique among comparable lines.

Meetings and Reports

Styrene Copolymer Sheeting

THE availability of a new rigid plastic sheet material, made from a copolymer of polystyrene and rubber, has been announced by the Campco Division, Chicago Molded Products Corp., Chicago, Ill. Called Campco S-300, the sheet is made by extrusion through specially designed continuous equipment to produce a material having a smooth surface and a high gloss finish. The sheeting, in an unlimited color range, can be supplied in any desired length in widths ranging from 26-58 inches and in thicknesses from 0.005-0.125-inch.

Properties of the raw material from which the sheet is made are as follows:

Tensile strength, psi	4,000–5,000
Rockwell "M" hardness	30–40
Elongation, %	22–30
Specific gravity	1.04–1.06
Modulus in tension, x 10^5 psi	3.3–3.8
Yield point, psi	26,000
Izod impact strength, ft.-lbs.:	
Notched	1.5–3.0
Unnotched	11–18
Heat distortion temperature, °F.	155–163
Flammability, in./min.	1.2
Thermal coefficient of expansion, in./in./°C. x 10^{-5}	6.5–8.5

The sheet has high impact strength without sacrifice of formability; machines easily; and is dimensionally stable since its water absorption is low. The material is particularly adaptable for applications requiring a thin section, and lends itself well to vacuum forming methods, it is also claimed. According to E. F. Bachner, Jr., vice president in charge of the Division, Campco S-300 can compete in many applications with conventional sheet steel, aluminum, wood, paperboard, fiberboard, glass, injection molded plastics, and other materials.

The Campco Division represents a $500,000 investment by the parent company in the future of extruded copolymer sheet. The Division's production capacity of 500,000 pounds a month makes it one of the largest potential suppliers in the field. The company intends to work with other types of extrudable plastics to produce sheets with special forming properties. Plans are being made to warehouse standard sizes and colors of the S-300 sheet throughout the country.

CALENDAR

Sept.	28–30.	Committee D-20, ASTM. Chalfonte-Haddon Hall, Atlantic City, N. J.
		American Management Assn. National Personnel Conference, Hotel Statler, New York, N. Y.
Sept.	30–Oct. 2.	Committee D-9, ASTM. Chalfonte-Haddon Hall, Atlantic City, N. J.
Oct.	1.	Fort Wayne Rubber & Plastics Group, Van Orman Hotel, Fort Wayne, Ind.
Oct.	6.	Buffalo Rubber Group, Hotel Westbrook, Buffalo, N. Y.
		The Los Angeles Rubber Group, Inc. Hotel Statler, Los Angeles, Calif.
Oct.	8.	Northern California Rubber Group.
Oct.	14.	Newark Section, SPE. Military Park Hotel, Newark, N. J.
Oct.	16.	New York Rubber Group, Henry Hudson Hotel, New York, N. Y.
		Boston Rubber Group, Boston, Mass.
Oct.	20–21.	Rubber Section, N. S. C. Conrad Hilton Hotel, Chicago, Ill.
Oct.	21.	Washington Rubber Group, Washington, D. C.
		New York Section, SPE. Hotel Gotham, New York, N. Y.
Oct.	27.	Association of Consulting Chemists & Chemical Engineers, Inc. Twenty-Fifth Anniversary and Annual Meeting, Hotel Belmont Plaza, New York, N. Y.
Nov.	9–12.	Refrigeration & Air Conditioning Exposition, Cleveland, O.
Nov.	13.	Philadelphia Rubber Group, Poor Richard Club, Philadelphia, Pa.
Nov.	18.	Washington Rubber Group, Washington, D. C.
		New York Section, SPE. Hotel Gotham, New York, N. Y.
		Scrap Rubber & Plastics Institute, NAWMD. Hollywood Beach Hotel, Hollywood, Fla.
Nov.	19.	Rhode Island Rubber Club, Metacomet Golf Club, East Providence, R. I.
Nov. 30–Dec.	1.	Rubber & Plastics Division, A.S.M.E. Annual Meeting, Hotel Statler, New York, N. Y.
Nov. 30–Dec.	5.	Exposition of Chemical Industries. Commercial Museum and Convention Hall, Philadelphia, Pa.
Dec.	11.	New York Rubber Group, Christmas Party, Henry Hudson Hotel, New York, N. Y.
		Boston Rubber Group, Christmas Party.
Dec.	12.	Southern Ohio Rubber Group, Christmas Party, Miami Valley Country Club.
Dec.	15.	Buffalo Rubber Group.

Mold Release Compound

CD MOLD RELEASE B, a compound originally developed for use with polyester and epoxy resins, has been announced by Chemical Development Corp., Danvers, Mass., as an excellent release agent for phenolic, melamine, and similar plastic materials. Molding processes which employ this compound produce parts said to have a high gloss or natural luster without buffing or polishing, on which no oily film or burned areas are found.

Mold Release B is a clear, fast-drying compound that can be applied by brush, spray, or cloth. Its use is said to result in increased production, while producing no discoloration of colored articles. The compound may be obtained in quart, gallon, five-gallon, and drum quantities.

New SPE Secretary

P. J. UNDERWOOD has been appointed the new executive secretary of the Society of Plastics Engineers, Inc., 513 Security Bank Bldg., Athens, O., to fill the vacancy left by the resignation of Mrs. Bess R. Day. A graduate of Hamilton College, Mr. Underwood attended Georgetown Law School, was a commodity-industry analyst for the United States Department of Commerce, and has been in

P. J. Underwood

organizational and public relations work for trade associations. Announcement of the appointment was made by Walter F. Oelman, of Standard Molding Corp. and current SPE national president.

International Conference Plans

Preliminary plans have been announced for the tenth annual National Technical Conference of the Society of Plastics Engineers, Inc., to be held January 27-29 at the Royal York Hotel, Toronto, Ont., Canada. More than 1,000 technical men from the domestic, Canadian, and foreign plastics industries are expected to attend the Conference, which has as its theme, "Plastics International."

The program will include a symposium on developments and applications of modified styrenes; a discussion of world developments in plastics by A. Renfrew, Imperial Chemical Industries, Ltd., England; a demonstration of reinforced plastics molding; a forum on extrusion conducted by G. M. Prall, Western Textile Products Co.; a research symposium organized by A. J. Warner, Federal Telecommunication Laboratories, Inc.; the presentation of prize-winning papers in the Society's 1953 Prize Paper Contest; and a forum, "Plastics Industry Challenges Education," conducted by the SPE education committee.

In addition, the sessions will include technical talks on film and sheeting; properties of Mylar film; marking and decorating of plastics; plastics material problems in the field of power distribution, automatic molding of thermosetting plastics; automatic molding of thermoplastics with air-operated presses; developments in polyethylene; and vinyl plastisols and plastigels.

Synthetic Fats as Plasticizers

ACETOGLYCERIDES, synthetic fats made by chemically substituting acetic acid for longer chain fatty acids in natural fat glycerides, have been evaluated as secondary plasticizers for vinyl resins by the Southern Regional Research Laboratory.

(*Continued on page 800*)

Scientific and Technical Activities

Fort Wayne Group Symposium on Silicone Elastomers

A MEETING of the Fort Wayne Rubber & Plastics Group was held February 5 at the Van Orman Hotel, Fort Wayne, Ind., in which a panel discussion on Silicone Elastomers was featured. Moderator for the discussion was S. M. Lillis, Victor Mfg. Co.

Short talks on a particular phase of the silicone industry were given by each of the following panel members: J. J. Deasy, General Electric Co.; G. Konkle, Dow Corning Corp.; P. G. Magner, General Tire & Rubber Co.; and J. E. Martin, Williams-Bowman Rubber Co. The panelists then answered one formal question as well as questions from the floor, but the latter are not recorded in this report.

Polymer Production

As a point of departure for his address, Mr. Deasy described silicone rubber as a mixture of fillers, catalyst, and a certain polymeric substance consisting of carbon, hydrogen, oxygen, and silicon that may be profitably fabricated into useful elastomeric products. The speaker then followed the process of obtaining a translucent, flexible, elastomeric sheet of silicone rubber from the shiny, grey, hard lump of silicon, which is the basic raw material.

The silicone polymer is a result of a carefully controlled chemical reaction designed to produce an extremely pure difunctional material. Finely crushed silicon is charged with a copper catalyst into a cylindrical reactor, and gaseous methyl chloride is passed upward through this reaction bed. The temperature of the bed is held at prescribed temperature and pressure limits as dictated by the thermodynamics of the direct process reaction. From the top of the reactor is taken dimethyldichlorosilane, the desired product, plus other reaction products such as silanes, chlorides, and hydrocarbons. These gases are condensed and transported to a still for rectification.

The close boiling points of these products require that various techniques be used to obtain a pure product. One of these techniques consists of hydrolysis of the dimethyldichlorosilane in the still to form intermediates that differ sufficiently in their boiling points to permit separation of the products. These fractions of the intermediates are then condensed with either acidic or basic catalysts to form polymers of high molecular weight.

The desired resulting polymer, called silicone rubber gum, is generally a polymethylsiloxane with an average molecular weight ranging from 300,000-500,000. It is colorless, has a viscosity of about 10,000,000 centipoises, and acts like a high-viscosity oil. Such a gum exhibits very good compounding properties with a variety of fillers, including silicas, metallic oxides, carbonates, and silicates. The use of organic fillers is precluded in most applications owing to high-temperature duty to which the product is usually subjected. Consequently inorganic fillers free from acid or alkali producing impurities at the application temperature involved are used. Incorporation of the filler is usually accomplished on a two-roll rubber mill. The addition of a catalyst effectively completes the silicone rubber compound.

The catalyst is normally added, in conjunction with heat and pressure, in the product forming operation. Benzoyl peroxide and tertiary butyl perbenzoate are popular catalyst compounds which produce oxygen containing free radicals, the functioning part of the catalyst. Various other materials such as colors and compression set additives must be added to complete the compound, but these materials must be compatible with the peroxide, free radical, curing mechanism, and the probable high temperature at which the product will be used.

Silicone rubber can be fabricated with the usual rubber industry equipment. In this respect, compression and transfer molding, extrusion, calendering, and coating operations have been carried out without difficulty.

Question: What is the process involved in bonding silicone rubber to itself and other surfaces?

Answer: The surface should be cleaned and primed with a special silicone primer. If the bond is to be formed during the molding operation, only a primed surface is necessary to effect the bond; if cured silicone rubber is being bonded, however, a thin layer of a silicone adhesive must be used over the primed surface to obtain a bond. Heat and slight pressure are necessary to vulcanize the bond.

Applications and Properties

Mr. Konkle cited as the most important properties of silicone rubber the stability, oil resistance, low-temperature flexibility, electrical properties, and resistance to the effects of outdoor weathering. In describing these properties, the speaker also listed applications wherein they are being utilized.

In the case of high-temperature stability, called the outstanding feature of silicone rubber, experiments have shown the satisfactory functioning of this material for extended periods of time at 300-400° F., and for limited periods at 500-600° F. Test data were quoted wherein samples exposed for 60 days at 390° F. in an air oven had increased 10 points in Shore hardness and had lost only 40% and 60%, respectively, of their original tensile strength and elongation.

Specific examples of applications which have demonstrated this high-temperature stability include the satisfactory performances of a silicone rubber gasket continuously for two years at 480° F.; of ducting made of silicone rubber and glass cloth at temperatures of 500-700° F.; of spark plug caps for automobiles; and of silicone rubber rolls in the processing of glass, metals, and plastics. This last-mentioned application of processing plastics also utilizes the excellent release properties of silicones. The low compression set of the material at high temperatures (10-15% after 22 hours at 300° F. for some stocks) has led to its wide usage in O-rings and in aircraft push-rod seals.

These applications, as O-rings and as seals, also require resistance to the effects of hot lubricating oils. Data given for the characteristics of silicone rubber in this respect show that the resistance is dependent on the aromatic content of the oil. In particular, after 70 hours at 350° F. in ASTM No. 1, a low aromatic oil, the swell is about 10%; whereas with a high aromatic oil, ASTM No. 3, the swell under the same conditions is approximately 50%.

For low-temperature applications, silicone rubber is said to be superior to any other rubber. All silicone rubbers have brittle points of —80° F. or below, and all remain flexible down to at least —50° F. Special types of the material, which remain flexible down to —100° F. and have a brittle point below —130° F., are compounded for use on high-altitude aircraft. The amazing feature of this extremely low-temperature flexibility is that the high-temperature properties of the material are not impaired.

The electrical properties of silicone rubber compare favorably with those of electrical grades of organic rubber. Dielectric strength, power factor, and dielectric constant remain relatively constant from ambient temperatures up to 500° F. In addition, silicone rubber has arc resistance and corona resistance far superior to those of any organic rubber. These electrical properties, plus those of high-temperature stability and low-temperature flexibility, have resulted in the use of silicones in the following capacities: as insulation for ignition wires; as sheeting into which heating elements are molded; and as tapes for use as the outer wrapping of field coils, armature and transformer coils and solenoids. In this last usage, the tapes vulcanize to form a resilient, void free, moistureproof, and oil-resistant jacket which resists thermal and mechanical shock.

Resistance to the effects of outdoor weathering is a characteristic possessed by all silicone rubbers. Samples have been exposed to Florida weather for as long as four years with no appreciable change in properties. Also, no signs of checking or cracking were found although the test pieces were exposed in both bent and stretched positions.

Question: Why are precise curing schedules necessary for silicone rubber?

Answer: During the initial vulcanization of silicone rubber under heat and pressure, gaseous products are formed and entrapped in the piece. During the secondary air oven cure these volatiles are driven off. It is necessary that the temperature of the final cure be attained at a rate which will not cause the volatiles to escape so rapidly that porosity develops. Thus a gradual rise in temperature, dependent on the thickness of the part and the specific compound involved, is necessary.

Fabrication and Reclaiming

The practice of cleanliness in the fabrication of silicone rubber extruded and molded parts was discussed by Mr. Magner. Cleanliness at every stage of fabrication is exceptionally important since the silicone product is usually used at temperatures which decompose any organic impurities. The types of precaution necessary to achieve uncontaminated products are not unusual to high-quality rubber production, but the degree or extent to which these precautions should be maintained is seldom practiced. Typical sources of organic contamination are grease, lint, wood splinters, brush fibers, and rubber materials. Their presence is manifested by the appearance of dark brown areas, porosity, charred material, brittleness, or rough extrusions. Since in

most cases this evidence will be recognized only after oven cure, and because silicone rubber is a high priced material, cleanliness in a fabricating plant is considered mandatory.

The high cost of the material also contributes to making silicone reclaiming profitable. Other factors important in this respect are the simple reclaim methods used and the excellent results obtainable. In general, the reclaim procedure involves several or all of the following steps: (1) grinding cured rind and defective parts on a two-roll rubber mill to approximately 1/16- to ⅛-inch mesh; (2) treating with live steam 4-8 hours at 290-295° F.; (3) partial drying in a warm air oven; (4) banding to form a homogenous mass; and (5) recompounding to give the desired material.

Stock resulting from such reclaim procedures may have equivalent or superior properties as compared to new silicone stock. Mixtures of reclaim and new material also give good properties. In one case in particular, a stock containing approximately 25% reclaim showed an increase in tensile strength by 15%, an increase in elongation by 10%, and a reduction in durometer hardness by one point.

Question: What are the advantages of silicone as a mold release for rubber molding?

Answer: There are three. Since silicone does not decompose at temperatures involved in the curing of organic rubber, no film is built up in the mold cavity; the silicone release material does not require application after every cycle; and silicone does not adhere to rubber.

Fabrication—Molding and Curing

The view that fabrication of silicone is very similar to that of organic rubber was advanced by Mr. Martin. An experienced rubber fabricator should have no problem with the newer material since the processes involved in each are basically the same. Consequently the differences rather than the similarities between the two were considered.

Mold design was the first topic discussed in this respect. Silicones shrink 4-5%; whereas other rubbers shrink approximately 1½%. For this reason, common molds for silicone and other rubbers cannot be used unless the part is very small or the dimensional tolerances are relatively large. The general cavity design for both can be the same except in the case of parts with undercuts and parts like grommets which must be pressed through a hole. Because of the low tensile strength and tear values of silicones, all mold edges must be rounded, and oftentimes a split mold construction is necessary. Higher mold pressures are required for silicone molding since the material softens much less at its curing temperatures than do rubbers. Therefore, in order to obtain a thin flash, it is customary to make less cavities in molds designed for silicones.

In discussing raw stock preparation, the speaker said that the material must not be allowed to stand around for long periods after milling or extruding because of its tendency to set up. In some cases it is necessary to prepare stock twice in one shift in order to get the necessary flow in the mold. In order to reduce waste, the stock is sometimes cut and weighed by hand. Also mentioned by Mr. Martin was the fact that a light dusting with mica makes the tackier stocks easier to handle.

In molding, the silicone compounds do not lend themselves to simple alterations, and difficulties in rubber molding that are often corrected by compound changes must be corrected in silicone molding by variations in molding techniques. These variations are accomplished by varying pressures and temperatures, bumping, and by varying the size and the shape of the raw slug.

For trimming and finishing, dry-ice tumbling is not successful because of the low-temperature resistance of most silicones. Consequently the trimming is usually done by hand, machine, or punch prior to oven recuring. Also, the parts must be cleaned of thin overflow before recuring in order that the trimmings will not cure fast to the parts.

It is usually necessary to supplement the press cure with an oven cure. Silicone parts hold their shape very well in the oven heat and can be hung on rods or laid on perforated plates. The oven itself must be constructed to permit free circulation of air (to obtain uniform cure) and escape of objectionable gases and smoke.

In conclusion, the speaker reiterated that the most important consideration of the fabricator is to protect himself against unnecessary waste of the high priced silicone rubber material.

Reports on Summer Outings

N. Y. Group Golf Tourney

THE golf outing of the New York Rubber Group held on August 4 at the Baltusrol Golf Club, Springfield, N. J., attracted a near-record crowd of about 200, of which 177 played golf. Arrangements for the outing, which included a dinner, were handled by C. O. Davidson, Binney & Smith Co., assisted by T. F. Callahan, Witco Chemical Co.; G. H. Provost, United States Rubber Co.; and A. H. Eufer, R. T. Vanderbilt Co.

Low gross for members was won by E. B. Curtis, R. T. Vanderbilt; with V. Lake, Pioneer Latex & Chemical Co., second, and F. Salamon, third. Low gross winners for guests were J. Howath, J. C. Vincent, and S. Woznak, in that order. Sherman Doner, Raybestos-Manhattan Co., established the high gross figure.

In the putting contest the first prize went to G. Sprague, Sponge Rubber Products Co. Other winners were J. Schrieber, M. F. Stiles, and R. G. Newburg.

There were almost eight winners in the kickers handicap, and 17 golfers won prizes for birdies. Some of the latter, including Curtis, Vincent, and Hubbard, had two birdies.

We are indebted to Jesse Young, of Advanced Solvents & Chemical Corp., for the accompanying photographs taken at the outing.

Chicago Group's Successful Affair

THE annual summer outing and dinner was held by the Chicago Rubber Group on July 24 at the St. Andrews Country Club, West Chicago, Ill. Approximately 310 members and guests attended and participated in golf and other athletic events. Chairman for the outing was W. H. Lussie, R. T. Vanderbilt Co., with assistance from J. Dunn, C. P. Hall Co., and other members of the Group.

First-prize winners in the various golfing events were: low gross, J. Adams, Sears, Roebuck & Co.; high gross, H. Trilling, Rubber Lining Corp.; long drive, B. Vandermar, Acadia Synthetic Products; nearest to pin, J. Martin, Pure Oil Co.; putting contest, C. Woodhead, Central Rubber & Mfg. Co.; low putts, G. Popp, Phillips Chemical Co.; blind bogey, A. Schoeller, Armstrong Rubber Mfg. Co.; most improved golfer, B. Ovesen, Phoenix Mfg. Co.; and Peoria Handicap, E. Altman, Transfer Co.

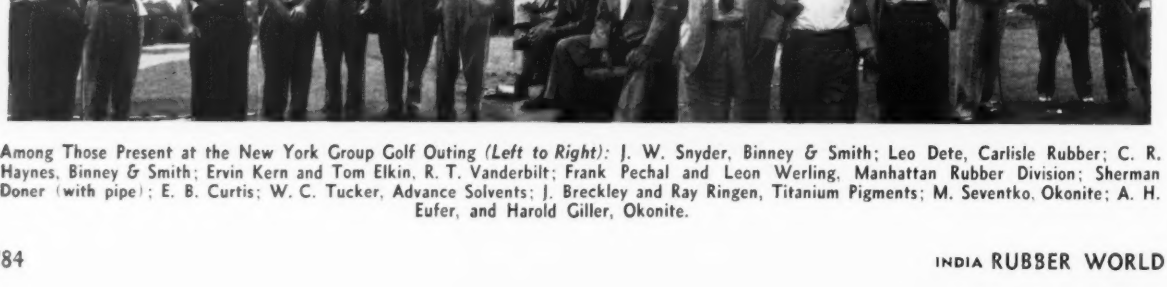
First-prize winners in the other activities were: horseshoes, M. Leonard, Binney & Smith Co.; darts, J. Harrisko, Williams-Bowman Rubber Co.; and baseball, A. Laurence, Phillips.

Other prizes for runners-up were also given in the golf tournament and athletic events. Each person attending the outing received a door prize.

Safety in Rubber Manufacture

THE Rubber Section of the National Safety Council will meet on October 20-21, 1953, at the Conrad Hilton Hotel, Chicago, Ill., as part of the National Safety Congress. The conference will consist of two afternoon sessions and a lunch-

(Continued on page 832)



Among Those Present at the New York Group Golf Outing *(Left to Right)*: J. W. Snyder, Binney & Smith; Leo Dete, Carlisle Rubber; C. R. Haynes, Binney & Smith; Ervin Kern and Tom Elkin, R. T. Vanderbilt; Frank Pechal and Leon Werling, Manhattan Rubber Division; Sherman Doner (with pipe); E. B. Curtis; W. C. Tucker, Advance Solvents; J. Breckley and Ray Ringen, Titanium Pigments; M. Seventko, Okonite; A. H. Eufer, and Harold Giller, Okonite.

NEWS of the MONTH

Strong representations from the rubber industry and the State Department were necessary to obtain passage of Public Law 205—83rd Congress, the synthetic rubber plant disposal bill, before that Congress adjourned about August 1. The three-man Synthetic Rubber Facilities Disposal Commission is expected to be appointed by the President in September. The Reconstruction Finance Corp. is preparing brochures on two butyl rubber plants, eight petroleum butadiene plants, 13 copolymer plants, and one styrene plant, but these are not likely to be ready until about November 1, when the Disposal Commission should be ready to advertise for bids. The Commission has until February 1, 1955, to submit its report to Congress, and if proposed sales contracts are not rejected within 60 days to the extent that less than 500,000 long tons' annual capacity of GR-S and 43,000 long tons of butyl rubber remain, the Commission may proceed with such sales.

Meanwhile the RFC planned to close the Institute, W. Va., copolymer plant on September 19, in order to match production with demand for GR-S, which has fallen off considerably. A new sales procedure requiring purchasers of GR-S to place firm orders three months instead of one month in advance was proposed in August.

Representatives from The Rubber Manufacturers Association, Inc., and the National Association of Independent Tire Dealers appeared before the House Ways and Means Committee in July and August to urge the reduction and eventual elimination of the federal excise taxes on tires and tubes.

The Senate Small Business Committee in a report issued July 27 asked the Justice Department and the Federal Trade Commission to investigate alleged monopolistic practices of the tire manufacturing industry.

The Natural Rubber Bureau has renewed its campaign to have American manufacturers buy more natural rubber and the government to raise the price of GR-S and reduce its production in order to bolster up declining prices for natural rubber.

No agreement has been reached on the wage increase negotiations between the Big Four and the United Rubber Workers, CIO.

Washington Report by Arthur J. Kraft

Plant Disposal Awaits Appointment of Commissioners to Get Started

With the President and his chief adviser, Sherman Adams, out of town much of August, the White House appeared in no hurry to name the three commissioners who are supposed to handle sale of the government's synthetic rubber producing facilities to private industry. The President, from the summer White House in Denver, signed the Rubber Facilities Disposal Act on August 7, a few days after its final approval by Congress. The job of sifting names of prospective commissioners was delegated to Gabriel Hauge, Presidential assistant in charge of economic affairs. As of late August, Mr. Hauge's office was informing inquirers that it will be at least several weeks before commissioners are selected and the appointments made.

The rubber community seemed a little anxious over the slow start, having much in mind the recent Congressional debates, in which a major point raised was providing sufficient time for carrying out the disposal job. Some activity, however, was in progress during August in laying the groundwork for disposal. Morton Yohalem, Special Deputy to the RFC Administrator for rubber disposal, was busy putting together brochures on the 24 facilities considered most likely to attract buyers—the two butyl plants, eight petroleum butadiene plants, 13 copolymer plants, and the one styrene plant.

Preparation of advertising brochures, giving fairly complete data on each of the plants, is a necessary first step in the disposal procedure. The brochures, when completed, will be available to interested parties who may wish to enter bids for facilities. The brochures are expected to run about 15 or 20 pages each. They will not tell the complete story on each plant, but will provide, under one cover, a considerable amount of basic factual data, most of it gathered from RFC files. Such data are expected to include the cost of the plant, the operating costs, its raw material sources, utility layout, etc. As of late August, none of the brochures was completed. They were expected, however, to be completed before November 1—a date which, at a rough guess, should find the disposal commission ready to put out a call for bids.

State Department and Industry Efforts Helped Pass Bill

The August lull was in marked contrast with the frenzied activity of the previous month in Congress. The disposal bill had very rough sailing through Congress before its final passage in the last hours of the now-closed legislative session. An even half-dozen drafts were attempted before a version acceptable to both sides emerged. The House, which had initiated the legislation, three times voted and approved rubber disposal bills, only to have the two earlier votes rendered ineffectual by their rejection in the Senate. For three weeks in late July it was touch-and-go as to whether the bill would become law or fall by the wayside, a victim of unreconciled and deeply felt difference of opinion. Time—the heavy schedule of "must" legislation which had to be rushed through under pressure for adjournment—was against action on the rubber bill this year. For a while it also appeared that the Democratic Party, holding the power of decision in the Senate, felt the same way.

For brief moments the obstacles to passage seemed to melt away. The sporadic interludes of optimism, however, each was followed swiftly by moods of despair as fresh difficulties loomed. In the end the desire of the rubber community and the executive branch to have a rubber disposal bill at any cost prevailed over the opposite dispositon of many of the legislators. Senate Democrats, standing fast and together in their insistence on certain "anti-monolopy" safeguards being written into the bill, won out. Their equally stubborn opponents were forced to yield and grant the concessions in order to get the bill through.

Strong representations by the State Department have been credited by some observers with finally carrying the day. Officials of that department put in their most effective work on behalf of disposal legislation just when the outlook for passage looked bleakest. Credit also is due the rubber manufacturing industry, which prevailed on House members of the conference committee to accept the "anti-monopoly" amendments rather than let the bill go over until next year.

Public Law 205—83rd Congress

Under the bill which became Public Law on August 7 the President will appoint three citizens not currently associated with the rubber industry or its sister industries in the synthetic rubber field—chemicals and petroleum—to serve as members of the Synthetic Rubber Facilities Disposal Commission. When they are ready, the commissioners will solicit bids on each of the 28 facilities offered for sale under the bill. The solicitation will be done through public advertisements. The Commission will remain open to the receipt of bids for a period of at least six months. When the bidding period is ended, the Commission promptly will enter into negotiations with those submitting proposals (bids) for the purpose of making definitive sales contracts. The legislation requires that the negotiating period be at least seven months. When negotiations are completed, the Commission must report back to Congress. The legislation requires that the Commission submit that report no later than January 31, 1955.

In the 60 days following submission of the report either chamber of Congress may vote to reject any or all of the proposed contracts. If any are rejected, then the prospective purchasers whose contracts were not turned down by Congress will have 30 days in which, if they wish, to withdraw from their contracts. All sales will be off unless sufficient capacity to produce at least 500,000 long tons of GR-S and 43,000 tons of butyl is transferred to private ownership. If these minimum tonnage targets are not met, then disposal is off, and the Rubber Act of 1950, which authorizes the government to operate synthetic rubber plants, will be extended automatically until March 31, 1956.

The minimum tonnage targets could be missed by failure of the Commission to negotiate enough contracts to make up the minimum tonnages. Should that occur, then disposal would be out the window on Jan-

uary 31, 1955. However, should the Commission meet or exceed the targets, there remain two other threats to achieving disposal. For one thing, Congress could reject enough sales to bring the total tonnage below the necessary level. For another, even if Congress, disapproving some sales, permits enough to go through to meet minimum tonnage requirements, subsequent voluntary withdrawals from contracts on the part of prospective purchasers could drop the total sales btlow the target level. For instance, the Commission might negotiate contracts covering 600,000 tons of GR-S capacity. Congress might reject the sale of one plant with a capacity of 30,000 tons. This action would leave 570,000 tons, well above the 500,000-ton minimum. These contracts, covering 570,000 tons, would take effect 30 days later. However, if prospective buyers withdrew in that 30-day period from contracts covering more than 70,000 tons of capacity, then all contracts would be nullified, and there would be no disposal.

The Congressional review procedure would have been infinitely simpler had the views of Representative Paul Shafer and other Republicans (and a good many House Democrats) won over the Senate Democrats. The Shafer bill, which had passed the House in June, provided that if Congress found any one proposed contract objectionable, then all would be rejected. But the Senate Democrats fought long and hard for the right of Congress to use its veto power with some discretion, pinpointing and knocking out the "bad" contracts without affecting the others and jeopardizing the entire program. The House conferees and the Senate Republicans resisted this "item" veto proposal, known as the "Long amendment" for its author Sen. Russell B. Long (Dem., La.) but ultimately yielded at a price. That price was making it crystal clear, by putting it into the bill, that disposal is contingent on sale of a minimum tonnage of productive capacity and the granting of the contract withdrawal option to prospective purchasers.

The principal objection to the "item" veto was that it would, or could, result in a great inequity to prospective plant purchasers making irreproachably fair offers to the government. To illustrate, Company "A" might enter a contract to buy a copolymer plant which could be operated profitably only if a certain butadiene plant were sold. If Congress disapproved the sale of the particular butadiene plant, Company "A" would be stuck with its copolymer plant, but would be unable to have the source of butadiene it considers necessary for profitable operation. The natural result of such a procedure, Shafer and others warned, would be to discourage any offers for the copolymer plant, in the first place, since no company in its right mind would commit itself to buying a copolymer plant with such uncertainty beclouding its ability to secure raw material. To overcome this defect, and protect the equity of bidders, the House conferees insisted on granting each purchaser the option to withdraw from his contract should Congress disapprove any single contract. The minimum tonnage requirement was put in the bill as an ironclad guarantee that disposal will not result in substantial shortages of synthetic rubber, which otherwise could occur, under the Long amendment, by Congressional disapproval of a number of sales. In this connection it should be borne in mind that the bill requires the government to take out of production and place in "standby" all plants not sold. Without a minimum tonnage criterion in the bill, it is conceivable that Congress, by a freehanded exercise of its "item" veto, could create a situation whereby only 100,000 tons of GR-S capacity might be sold, and the balance placed in mothballs.

The Long amendment, as expected, proved the most difficult issue between the House and the Senate. The Senate Democrats refused to yield to the very strong opposition to that amendment from the Republicans in the Senate and from both camps in the House. The House-Senate conferees knocked out the Long amendment on July 27, when they also put the quietus on the other major Democratic-sponsored amendment, requiring an anti-trust law compliance finding by the Attorney General. The bill reported out of conference July 27, though quickly passed by the House, met a roadblock in the Senate, where the Democratic policy committee announced its firm opposition to any disposal bill without those amendments. Counting noses, Republican leader William Knowland, of California, decided not to press for a vote and offered the motion to reject the conference report and ask for another conference with the House. This was done. The House conferees at first declared they would refuse to go back into conference, but finally agreed at another try, when House majority leader Charles Halleck pointed out that to refuse another conference would leave the onus for killing the bill on the Republicans. It was Senator Knowland, speaking for the Republican policy committee of the Senate, who made the motion to reject the first conference report. Halleck noted in urging Shafer, manager of the disposal bill in the House, to meet again with the Senate conferees.

The conferees met early in the afternoon of July 29 and quickly adjourned for a few hours. Late in the afternoon they met again and came out with the bill which was passed by voice vote in both chambers that evening. It was at the late afternoon meeting that the House conferees laid down their conditions for accepting the Long amendment: namely, the minimum tonnage requirement and the contract withdrawal option. These conditions were accepted by the Senators, albeit without enthusiasm in the case of the Senate Republicans. The head of the Senate conferees, Homer Capehart (Rep., Ind.), told the press later that the House proposed amendments will make prospective purchasers, rather than Congress, the "boss" in determining which plants are sold. Shafer, who offered these amendments as a condition for accepting the Long amendment, did not show much enthusiasm for them, either. He and other House conferees would have much preferred to have the Long amendment knocked out, but since they could not manage that, they insisted on the additional ammendments which were aimed at removing some of the sting from the Long amendment.

Shafer, who must be considered the "father" of the disposal legislation received unique recognition from his fellow conferees. For the first time in 20 years a Senate-House conference committee named a member of the House as its chairman. Shafer, who had to concede more than he wished in order to see the disposal bill enacted, explained why this unusual tribute was paid to him. The Senate conferees, he quipped, elevated him to this lofty post "so they could get a good look at me when they kicked me in the shins."

The other major issues before the conference committee were more easily resolved. The House conceded to the Senate's longer period for completing the disposal job, although it managed to get the Senate to make the January 1, 1955, reporting date a permissive deadline. If the Commission, still observing the minimum time periods for accepting bids and for negotiating (together 13 months), is ready to submit its report to Congress before January 1, 1955, it may do so, under the bill which finally cleared Congress. The Senate version originally required the Commission to submit its report on that date, regardless of whether it was able to beat the deadline. The other major point of difference also found the House conceding. The Attorney General is required to make a finding as to whether the proposed sale violates the anti-trust laws. Under the House version he had only to advise the Commission on anti-trust aspects of proposed sales.

On other differences of a minor, noncontroversial nature the House accepted the Senate version. The law requires that bids be accompanied by a deposit equal to 2.5% of the gross bid, not exceeding $250,000, and requires a cash down payment from purchasers of at least 25% of the purchase price, with the balance to be paid under government purchase money mortgages bearing interest of not less than 3%. The House bill had proposed deposits of 10% of the bid, with a maximum deposit of $500,000 and authorized an interest rate on the purchase money mortgages of not less than 3.5%.

RFC Shuts Institute Plant; Considers Three-Month Advance Order Plan

RFC took another step last month to reduce its production of GR-S in line with the substantial drop in demand from consumers when it ordered the shutdown of the Institute, W. Va., copolymer plant, effective September 19. Closing down of Institute will mean a reduction of about 5,000 tons a month in production of GR-S, since that is the current rate of production for the two units (each unit has two lines, or four lines in all) which have been producing the hot, dry GR-S for the past year. A year ago the agency shut down a third unit at Institute, the largest, but least flexible of the 13 copolymer plants owned by RFC. The plant has a rated capacity of 120,000 long tons annually, all of it hot, dry GR-S. For the most part Institute has operated on alcohol butadiene, supplied by the two nearby butadiene facilities which were shut down on July 31. The two units ordered closed on September 19 have a combined capacity of 7,000 tons a month, but were producing at 5,000 tons a month.

At the same time RFC was giving serious thought to revising its sales program, to require purchasers to place firm, advance orders for a three-month supply of dry GR-S, rather than a 30-day supply, as at present. A proposed draft order making this change was distributed by telegram to members of the RFC Rubber Industry Advisory committee on August 14 with a request for comments by August 24. The change, if placed into effect, will permit RFC better to plan ahead on its production of GR-S, officials believe. The idea had its inception during hearings on rubber disposal legislation before the House Armed Services committee in June, where it was suggested by the committee's coun-

sel. It is understood to have the support of RFC Administrator Kenton R. Cravens.

Sales of GR-S have fallen sharply, dropping from a second-quarter peak of about 190,000 long tons (201,000 tons including oil content of oil extended rubbers) to about 130,000 tons in the third quarter. Sales are forecast at 136,000 tons for the fourth quarter, beginning October 1. Production also has been following a downward trend. While below sales in the second quarter, production is well above sales during the third quarter and will push up government inventories of GR-S to about 80,000 tons on September 30. RFC is planning to produce only 122,500 tons of GR-S in the final quarter of this year.

If fourth-quarter sales match the predicted 136,000 total, inventories will be drawn down below the 70,000-ton level by the year's end. This state of affairs should make it easier for RFC to stay within the 85,000-ton inventory limit established by the Budget Bureau for June 30, 1954. RFC could, if it wished, produce at higher levels than presently planned in the coming quarter, taking the risk of pushing its inventories beyond 85,000 tons. That course, however, would require production cuts next spring in order to bring stocks down to 85,000 tons at the end of June. Instead, RFC is making the sharp production cut now, keeping its inventory safely within the bounds of the Budget Bureau ceiling.

RFC figures for July and August and September production are given below, in tons:

	July Sales	Aug. Prod.	Sept. Prod.
Total GR-S	50,403	52,635	49,238
LTP GR-S	32,563	34,000	31,660
GR-S Blk. Masterbatch	8,107	7,900	7,200
GR-S Oil Masterbatch	12,717	9,030	8,260
GR-S Oil-Blk. Masterbatch	1,764	2,130	2,000
GR-S Latex	3,538	3,300	3,835
GR-I	5,836	7,000	6,700

The figures for the various GR-S masterbatches are gross weight, including oil and/or black. Without oil the total GR-S tonnage for August amounts to 50,150, and the September tonnage 47,000. The fourth quarter GR-S figure of 122,500 tons is without oil, and this figure with oil amounts to 130,000 long tons.

Ask Tire Excise Tax Reduction

Tire manufacturers and dealers, speaking through their leading trade associations, recently urged Congress to reduce federal excise taxes on tires and tubes and ultimately to repeal them.

Their appeal was made before the tax-writing House Ways and Means committee, in the course of public hearings looking toward the framing of a program for a major overhaul, or revision, of the tax system.

Speaking for the manufacturing industry was Charles W. Halligan, chairman of the tax committee of the RMA tire division. Speaking for independent dealers was W. W. Marsh, executive secretary, NAITD.

Testifying on July 30, Halligan presented these three recommendations: "(1) The excise tax on tires and tubes is a tax on indispensable transportation, and should be completely eliminated. (2) Pending complete elimination, the rates should be reduced to 2.5¢ per pound on tires and 4.5¢ per pound on tubes. (3) A rate reduction should be accompanied by a provision for an equalizing credit on floor stocks."

Marsh urged that the "Committee give serious consideration to legislation leading to the repeal of the excise tax as it applies to tires and inner tubes. If that does not appear feasible at this time, then we recommend as an alternative that this Committee consider legislation that will result in a reduction of the taxes on tires and inner tubes so as to eliminate the discrimination in rates which presently exist."

The NAITD spokesman, testifying August 10, echoed the same major objection raised by the manufacturers: namely, that tires are no longer luxuries and should no longer be subjected to a form of tax generally placed on luxury items. Marsh, however, raised an additional objection of independent dealers. The tax, he said, is "passed on to the independent tire dealers, with the result that it seriously handicaps them in their competition with company-owned stores of the manufacturers and the mass merchandisers."

Explaining this statement, Mr. Marsh added, "A manufacturer's wholly owned store does not consider a final sale made until purchase by the customer. Thus, the manufacturer or company-owned store had no money tied up in excise taxes as does the independent dealer who must pay the tax when he purchases his stock of tires."

The independent tire dealer frequently has 10% of his working capital tied up in excise taxes and he realizes no profit from this capital since the tax is passed on separately and forms no part of the price on which the dealer's discount is figured, he noted.

Tires and tubes were first subjected to excise taxes at the close of World War I, and this tax was removed in 1926. The present taxes date from 1932. The tax rates were set at 2.25¢ a pound for tires and 4¢ for tubes, hiked in 1940 to 2.5 and 4.5¢, respectively, and doubled in 1941 to the present rate of 5¢ a pound for tires and 9¢ a pound for tubes.

Halligan pointed out that the present taxes amount to 10.41% of the published prices on a representative group of passenger-car tires and to 9.18% on truck tires as compared to the 8% tax levied on the manufacturer's price on automobile parts and accessories.

"We believe," he told the Committee, "the rates per pound should be reduced to a level which will make tires and tubes bear a tax burden comparable to related products in the automotive field, such as automobile parts and accessories."

However, he said, as long as the tax is necessary as a source of revenue, the present cents per pound basis should be retained, since an ad valorem (percentage of price) basis would be unwieldy if applied to tires and tubes.

If a reduction is made, he added, the legislation should provide for a credit on "floor stocks" equivalent to the tax reduction. Floor stocks are stocks of tax-paid tires in the hands of dealers.

"Unless a floor stock credit is provided," Halligan declared, "all dealers holding tax-paid stocks of tires and tubes on the effective date of the change would be placed in an inequitable position, as against those who later acquire stocks of tires and tubes upon which the tax need not be paid. In self-protection, dealers would begin to hold off purchases as soon as the rate change legislation was proposed, thus disrupting the even flow from manufacturer to consumer."

Tire Industry Probe Urged in Senate Report

The Senate Small Business Committee on July 27 released an 18-page report by members of its staff suggesting that the Justice Department take a new look at the selling practices of the tire manufacturing industry.

The staff report, entitled "Problems of Independent Tire Dealers," listed six such "problems:"

1. Dealers are limited in the number of brands they can sell, because there are only 18 tire manufacturers today as compared with more than 300 a generation ago.

2. Dealers must compete with manufacturer-owned retail outlets.

3. Dealers cannot compete with manufacturers in selling to bus operators, because of the tire manufacturers' practice of leasing tires to bus fleets on a mileage basis.

4. Dealers cannot sell to the Federal Government because the government buys directly from manufacturers at prices below dealer costs.

5. Dealers are faced with competition from chain outlets which buy private-brand tires at price differentials lower than the prices dealers pay to manufacturers.

6. Dealers are excluded from the "fifth" tire market because the spare tire comes on new cars as original equipment.

The staff report, in its conclusion, suggested that the Justice Department appraise the extent to which the tire manufacturing industry has refrained from restraint of trade practices for which it was cited in 1947 and reevaluate the practice of providing new cars with spare tires "to determine if this practice constitutes a tie-in-sale and is in restraint of trade." The report also urged the Federal Trade Commission to enforce its Quantity Limit rule—a rule now in abeyance under order of the District Court where it is being challenged by the tire industry, including some independent dealers.

George J. Burger, vice president of the National Federation of Independent Business, and a "former independent tire dealer," issued a concurrent statement declaring that the Small Business Committee staff report points to "conclusive proof of the ever-increasing trend of monopoly in the rubber tire industry." Mr. Burger, who apparently made his files freely available to the committee staff (he is quoted or cited as a reference eight times in the report), said the report shows the "necessity for public hearings to be held and a thorough investigation made of all matters pertaining to the rubber tire industry which have rested with the Department of Justice, the Federal Trade Commission, or any other government agency."

The staff report uses some sharp language in its recitation of the history of tire selling. The entry of Sears, Roebuck's private-brand Allstate tire in 1926 is described as "another blow to the independents," and when Montgomery-Ward and several oil companies came out with their own private brands a few years later, they "invaded the replacement market with almost immediate and dire effects on thousands of independent dealers." The tire manufacturers, by making these private brands available to chain outlets, created a "merchandising Frankenstein," according to the staff report. Firestone Tire & Rubber Co. found it necessary to set up its own retail outlets and did so "as fast as its independent became crippled or impotent." The report states that the tire manufacturers consistently lose money on their own retail operations.

The staff report cites several sources in support of its "assumption" that auto dealers pay more for the "fifth" or spare tire than the large independent tire dealers pay for tires. The report said that "rumors are rife" that auto makers make a neat profit on the fifth tire sold as original equipment. It also said that tire manufacturers' retail stores enjoy a "very material advantage of the independent dealer" because the company stores may defer payment of the manufacturers' excise tax on tires and tubes received on consignment from the parent company. The independent dealer, on the other hand, must pay the tax upon receipt of his tires and tubes.

"If the Bureau of Internal Revenue," the report stated, "feels that no administrative remedy exists for this discrimination, the solution of the problem might become the concern of the appropriate committees of Congress."

Other National News

Help Asked for Natural Rubber Industry

In a special August issue of its publication, "Natural Rubber News," the Natural Rubber Bureau, Washington, D. C., pointed out that although a bill for the disposal of the government's synthetic rubber plants had been passed (Public Law 205—83rd Congress), actual disposal may not take place for another 20 months, and the natural rubber industry must compete with GR-S at a fixed price of 23¢ a pound for that period.

The spot price of #1 Ribbed Smoked Sheets in early August was 22.75¢ a pound, which the National Rubber Bureau called not only a substantial but an alarming decline in relation to the basic economic needs of the rubber producing area.

Reference was made to the statement made in May by American rubber goods manufacturers at the time of the International Rubber Study Group meeting in Copenhagen that "normal market forces will ensure a market during the next 12 months for all the natural rubber which will be produced and at prices which will not be substantially lower than present prices."

The Natural Rubber Bureau said that the present price for natural rubber does not represent a fair price by any standard of comparative quality, and this situation cannot wait for another international discussion in October. Three lines of action were suggested to correct the situation: (1) The American manufacturers should implement their Copenhagen statement. (2) The price of synthetic rubber should be raised to reflect more nearly the price which would prevail under commercial operation. (3) Synthetic rubber production should be placed on a national security basis and not operated at a volume which perils the economies of the rubber producing areas.

Then on August 16, in a full page advertisement in *The New York Times* and in other newspapers throughout the country, the Natural Rubber Bureau reprinted a letter dated July 29, from Secretary of State John Foster Dulles to Senator H. E. Capehart, chairman of the Senate Banking and Currency Committee, urging passage of synthetic disposal legislation.

Secretary Dulles said, in part: "What we do in rubber is to a large extent the standard by which these countries measure the professions and the actions of the United States. They are convinced that government operation of these plants means subsidization and, therefore, unfair competition with natural rubber. . . . They say they are prepared to meet the competition of synthetic rubber privately produced, but are reluctant to proceed with investment in replanting and normal expansion so long as they are faced with the risk of arbitrary production and pricing policies on the part of a government-owned industry."

This advertisement concluded with the hope that the U. S. Government will raise the price and reduce the production of synthetic rubber in the near future.

[Actually, the American consuming industry has used 34% more natural rubber in the first seven months of 1953, as compared with the first seven months of 1952, according to the monthly report of RMA, issued August 21. Consumption of synthetic rubber is only 7.5% higher for the same period, and with the recent decision to discontinue GR-S production from alcohol-butadiene, about 100,000 less tons of GR-S will be available during the next 12 months. —EDITOR.]

Big Four Wage Talks Continue; Decision Imminent

Company-wide wage negotiations between Firestone, Goodrich, Goodyear, and U. S. Rubber, and the United Rubber Workers Union, CIO, the first of which began on June 23, were still in progress during the week of August 24. The Firestone talks, as indicated above, began on June 23 in Cleveland, O. Those with The B. F. Goodrich Co. started June 29 in Chicago, those wth Goodyear Tire & Rubber Co., July 13, in Cleveland, and those with United States Rubber Co., August 18, in Cincinnati, O.

According to the *United Rubber Worker*, official publication of the union, the following improvements are being sought: (1) substantial general wage increases; (2) improved pension and insurance benefits; (3) correction of plant and area wage inequities.

Union President L. S. Buckmaster stated in the August issue of the URW publication that the union is attempting to get Firestone, Goodrich, and Goodyear to recognize the inadequacy of the present pension and insurance programs and the importance of doing something in a way of liberalizing them.

Buckmaster added that: "While these negotiations could be limited to the subject of general wage increases, we are glad that at least some of the Big Four companies are showing signs that they realize the validity of our position in this need for liberalization of our present insurance and pension contract arrangements, which we first negotiated about three years ago."

Notices have been given by the union to each of the Big Four companies which will have the effect of cancelling the current collective bargaining agreements, in event that peaceful settlements of the economic issues cannot be accomplished, it was said. The cancellation dates of the respective collective bargaining agreements follow: Firestone, August 24; Goodrich, August 31; Goodyear, September 8; U. S. Rubber, September 8. In late August strike votes had actually been taken by the URW union locals at the Firestone and the Goodrich plants.

Consolidated Acquires Condenser Service Group

Consolidated Products Co., Inc., 15 Park Row, New York, N. Y., 36-year old engineering and equipment company serving the process industries, has acquired ownership of Condenser Service & Engineering Co., Inc., Hoboken, N. J., and its various affiliated companies, representing assets of more than $3,000,000, according to Herman Kahn, president of Consolidated Products.

Mr. Kahn also reported that William M. Kennedy, former president of Condenser Service, will retain active participation as chairman of the board of directors, and Maurice Grober will continue as general manager, of the Condenser Service. Personnel of the merged group will be maintained toward better and wider services to the industries which these companies serve.

The various affiliated companies of Condenser Service include Edge Moor Iron Works, Inc., Edge Moor, Del. which, with 24 acres on the Delaware River, has 200,000 square feet of modern facilities for ASME coded fabrication. Also included are Scranton Pump Division, Blackburn-Smith Mfg. Co., Inc., and Instrument Service Co., with plants at Scranton, Pa., and Raritan, N. J.

The consolidation of these two companies will make for a greater scope in their services into the fields of design, engineering, fabrication, and erection of boilers, surface condensers, evaporators and heat exchangers, for the oil refinery, marine and ship building, petroleum, refrigeration, sewage, power plant, plastics, and chemical and process industries.

Silicone-Coupled Heater Ducts

Aluminum exhaust ducting used for transporting air at temperatures up to 600° F. is being constructed with the bends and coupling made of glass cloth coated with SE-101 silicone rubber, product of General Electric Co., Pittsfield, Mass. The ducting is used in the Model 340 Convair Liner made by Consolidated Vultee Aircraft Corp.

Properties of the rubber which make it successful in this application are heat, crease, and abrasion resistance; flame retardancy; stability with solvents such as hydraulic fluid; and high dielectric strength. In particular, the material can be ignited only by an external flame and reportedly supports fire for six seconds or less. The glass-to-glass bonding strength and fast-curing properties of SE-101 also contribute to its use in this and other similar flexible tubing applications.

Gussett Boiler & Welding, Inc., recently moved to a new, larger, and better equipped plant at 1545 Whipple Rd. S.W., Canton 8, O. The company's products include steel tanks, ASME code vessels, pressure tanks, vulcanizers, pickling tanks, machine bases and frames, repair welding, etc.

Tyer Addition in Operation

Because of a constantly growing business—greater sales and greater production—Tyer Rubber Co. has expanded its plant facilities with a modern wing of 40,000 square feet at its Andover, Mass., plant. W. E. Brimer, treasurer, announced that the new addition went into operation August 3. The new building embodies many of the most modern features in industrial plant construction. The first floor is devoted to a completely equipped new laboratory and an enlarged roll covering plant. Of special interest are full-area traveling cranes of 20-ton capacity.

The growth of the Tyer company—founded in 1856 by Henry George Tyer, has been one of constant progress. Company products include molded and extruded industrial rubber parts; rubber covered rolls for textile, leather, paper, and other industries; druggists' sundries; and sports items. A large part of the output of the Tyer plant in Andover is in canvas and rubber footwear—casual shoes and tennis footwear, basketball and other active sports shoes, baseball shoes approved for use by the Little Leagues, hunting and fishing boots, rubbers, overshoes, and gaiters, and rubber shoes for farm and industry.

Promoted by General Tire

Appointment of a new Akron factory manager and four important personnel changes in the technical department have been announced by A. W. Phillips, general manager of manufacturing of The General Tire & Rubber Co., Akron, O.

Lawrence M. Baker, manager of product compounding, has been named factory manager of General's Akron plant, replacing H. J. Harmon, now manager of the company's new Marion, Ind., facility.

Baker, a veteran of more than a quarter century in the rubber industry, joined General in 1947 as manager of technical service. In 1948 he was moved up to his previous post. Last year he served as chairman of the Akron Rubber Group; he is also a member of the 25-Year Club of the Division of Rubber Chemistry, American Chemical Society.

In the other appointments, Phillips named Charles W. Stalker to succeed Baker; H. D. Harrington, manager of tire construction; C. B. Orr, technical consultant; and Chester F. Schwall, manager of truck tire construction and inflatables.

Stalker has been employed in the product compounding division since coming to General Tire two years ago. He formerly had been with General Motors Corp.

Harrington, with General 14 years, started in the mileage service department and later transferred to the technical department. All but two of those years have been spent at the Akron plant. When General opened its Waco operation, Harrington went to Texas as chief chemist, from 1944 to 1947.

Orr, a veteran of nearly 40 years in the rubber tire business, joined General in 1928.

Schwall, former technical manager of the inflatable products division, came to General in 1940. During World War II he was in charge of design work on the company's inflatable products for the Armed Forces. He is a member of the Ohio Society of Professional Engineers.

Breaks Ground for PVC Plant

William O'Neil, president and founder of General Tire, and other company representatives were present August 6 at ground breaking ceremonies which began construction of the company's new $6,000,000 polyvinyl chloride plant at Ashtabula, O. The 50-acre tract of land will contain a pilot plant in addition to the production facilities.

More Glycerine from Shell

A new plant is being erected at Norco, La., by Shell Chemical Corp., Rockefeller Center, New York 20, N. Y., for the production of allyl chloride and epichlorohydrin, chemicals used in the manufacture of glycerine and Shell Epon resins, respectively. The output of the unit will be used to increase the company's glycerine production by 25,000,000 pounds annually. Additional quantities of Epon resins and epichlorohydrin will also be available.

The new facilities have been designed to operate in conjunction with Shell's refinery at that location and will use propylene and other feed stocks it produces. The new plant will employ approximately 150 people when it is completed in late 1954.

Permanent Kel-F Exhibit

A permanent display of Kel-F (polytrifluorochloroethylene) polymer materials, including molding powders, dispersions, oils, waxes, and greases, and more than 125 different applications of this material has been set up in the Industrial Showroom of the Pullman-Standard Co., Chicago, Ill. The exhibit is currently open to the public after having had an initial showing to the trade and press.

Kel-F is made by The M. W. Kellogg Co., Jersey City, N. J., a subsidiary of Pullman, Inc.

New Wing for Tyer Rubber Co., Andover, Mass.

Harry D. Armitage

Emery Sales Staff Changes

Further evidence of the expansion program under way at Emery Industries, Inc., Cincinnati, O., since the close of the World War II, is seen in the appointment of district sales managers of the chemical sales division.

James W. Ritz, head of the Philadelphia office, now becomes eastern district manager. He will retain his Philadelphia headquarters, extending its coverage to include New Jersey, Delaware, Maryland, District of Columbia, and portions of Pennsylvania and New York.

Harry D. Armitage will continue at his present location in the Woolworth Building, New York, N. Y., as district manager at large.

Willard A. Colby has been made the southern district manager, with offices in Charlotte, N. C. He is in charge of all chemical sales in Virginia, North and South Carolina, Florida, Tennessee, Georgia, Alabama, and Mississippi.

Two new men have been assigned to this district: E. W. Sack, Greensboro, N. C., formerly a production supervisor with Emery at Cincinnati, and C. T. Burgess, Atlanta, Ga., who replaces J. P. Clancy, recently transferred to Boston to assume sales responsibility for a portion of the New England area.

In addition, N. F. Reinert has been shifted from Chicago to the eastern district. He has been replaced by W. J. Ryan, formerly with the Barrett Division of Allied Chemical & Dye Corp.

These new arrangements, according to K. K. Boyd, Emery vice president in charge of purchasing and sales, were necessary to service properly the Emery line which will expand considerably with the completion of the new ozone-oxidation plant and other Emery production facilities.

Purchases Crown Equipment

John J. Nagle, chairman of the board and president of Crown Cork & Seal Co., Inc., Baltimore, Md., recently announced that on August 24, Crown Cork & Seal Co. of Michigan, Inc., its wholly owned subsidiary, took over the machinery and equipment of the Crown Division of Mitchell & Smith at Detroit, Mich., a division of Sheller Mfg. Corp., and will continue the manufacture of crowns at that point.

3M Buys Irvington Firm

Purchase of Irvington Varnish & Insulator Co., Irvington, N. J., by Minnesota Mining & Mfg. Co., St. Paul, Minn., was announced August 4.

Herbert P. Buetow, 3M president, said the directors of 3M have approved a $7,000,000 agreement by which Irvington becomes a division of 3M. Irvington stockholders will receive 3M common stock and cash in exchange for their Irvington stock.

Buetow and Arthur E. Jones, Irvington president, stated the move is a natural one in view of their respective interests in the field of electrical insulation.

Irvington Varnish is best known for its insulating varnishes, varnished cloths and papers, and extruded plastic insulations. The company's chemical division produces an extensive line of resins, most of which are derived from the liquid of the cashew nut shell. These resins also are useful in the electronics field because of their high dielectric strength. In recent years Irvington has gained additional recognition with a line of bottle cap liners.

"Like 3M, Irvington Varnish & Insulator Co. has had a long-term research program aimed at improving existing products and developing new products," Buetow declared. "We think it is of tremendous importance to our company's continued growth to expand our services to the electronics industry."

According to Buetow, 3M has no plans to change Irvington Varnish's operating policies or its management team. Jones will remain president of the division. All other officers and executives will continue in their present capacities.

Robert L. Westbee, general manager of 3M's electrical insulating and sound recording tape division, will be responsible for liaison between the parent company and the new division.

Irvington Varnish & Insulator Co. was incorporated in 1906. A Canadian plant was built in Hamilton, Ont., in 1933. In addition to its home plant and offices at Irvington, the company has a plant at Monrovia, Calif., and two new plants in Newark, N. J.

Informative Annual Reports

A total of 1,923 industrial corporations and financial institutions has been honored by *Financial World* for producing informative annual reports for 1952. Five thousand reports from all parts of the Western Hemisphere were considered in this thirteenth annual competition, the purpose of which is to acquaint corporations with the need of making annual reports understandable and interesting to the small investor. Of the 1,923, a bronze Oscar-of-Industry trophy will be awarded to 100 companies for the best report in their respective industrial classification.

Companies eligible for the Oscar in the Rubber and Tire Classification include: American Hard Rubber Co.; Armstrong Rubber Co.; Dayton Rubber Co.; Firestone Tire & Rubber Co.; General Tire & Rubber Co.; B. F. Goodrich Co.; Goodyear Tire & Rubber Co.; Hewitt-Robins, Inc.; Midwest Rubber Reclaiming Co.; Mohawk Rubber Co.; O'Sullivan Rubber Corp.; H. K. Porter Co., Inc.; Seiberling Rubber Co.; Thermoid Corp.; Thiokol Corp.; and United States Rubber Co. In addition, American Cyanamid Co. and O'Sullivan Rubber Corp. received their first annual report cards this year for qualified 1952 reports.

Gerald R. Gonyer

Gonyer Succeeds Temporal

Harry D. Temporal, manager of the Chicago branch office of Farrel-Birmingham Co., Inc., Ansonia, Conn., retired September 1, after 43 years with the company. He is succeeded by Gerald R. Gonyer, his assistant for the past five years.

Mr. Temporal first joined the Farrel organization in 1910. His sales work in the field began in Cleveland in 1922, and in the 31 years that followed he was at various periods connected with the company's offices in Buffalo, Akron, and Chicago. He was manager of the Farrel-Birmingham Chicago office, 120 S. LaSalle St., since it was reestablished in 1946.

Mr. Gonyer's entire business career has been with Farrel-Birmingham, where he started in Ansonia in 1937. After several years in various production departments, he entered the sales division in 1945. In 1948, Mr. Gonyer was transferred to the Chicago office as sales engineer.

Franklin R. Hoadley, Jr., Transferred

The company has transferred Franklin R. Hoadley, Jr., sales engineer, from the main office at Ansonia to the branch office at Akron, O. Mr. Hoadley, after four years in the United States Army, joined Farrel-Birmingham in 1945. Upon completion of the company's two-year student engineering course, he was assigned to the process-testing laboratory as technical assistant and later was switched to the sales department in charge of regrinding and blocking calender rolls in customers' plants.

Franklin R. Hoadley, Jr.

Private Placement Financing

Thirteen manufacturers of rubber products obtained $104,920,000 in long-term financing from life insurance companies and other institutional investors in 1952, as compared with $108,050,000 to six companies in the previous year, according to the "1953 Yearbook of Private Placement Financing," published in July by E. V. Hale & Co., Chicago private placement specialist. Apart from one $100,000,000 loan in 1951, last year saw considerably more money distributed among more rubber companies than the year before, despite the much publicized tightness of the long-term money market. Total private placement in 1952 amounted to $5,032,803,000, with industrial corporations accounting for approximately 65%.

In 1952, $85,000,000 of the rubber industry's private placements went to six tire manufacturers at rates ranging from 3.25-5% and with maturities ranging from 10 to 30 years. These were, in order of decreasing loans, United States Rubber Co.; B. F. Goodrich Co.; General Tire & Rubber Co.; Armstrong Rubber Co.; Dayton Rubber Co.; and Carlisle Corp.

The remaining seven companies which obtained loans totaling $19,920,000 at rates ranging from 4.0-4.50% for terms of four to 15 years were H. K. Porter Co.; Hewitt-Robins, Inc.; Sheller Mfg. Corp.; Midwest Rubber Reclaiming Co.; American Wringer Co.; Thermoid Co.; and Converse Rubber Co.

Materials Handling Discussed

I. H. Richardson, president of Richardson Scale Co., Clifton, N. J., at a meeting of the American Society of Mechanical Engineers at Los Angeles, Calif., pointed out some significant developments in recent months which indicate a trend to automation in the handling of bulk materials, particularly in weighing. Management in such fields as rubber compounding is beginning to accept, he said, a highly advanced degree of remote automatic weighing and materials handling without doubting its practicality.

In a rubber plant where the standard mixing operation in the Banbury mixer takes only four minutes and requires the addition of 12 or more ingredients in proper sequence, each of the five groups of ingredients—carbon blacks, rubber, pigments, oils, and accelerators—is handled by a single cumulative hopper scale. One operator in a control room runs all operations serving the separate proportioning lines. The weights of the ingredients to be fed to the weighing hopper are set on calibrated dials. When the weight of the first material reaches its pre-established magnitude, the flow is stopped by an electrically triggered switch. New material then flows into the hopper until the second weight is achieved. The process is repeated until the formula is complete.

The above system, now in operation on a small scale at Dayton Rubber Co. and on a grand scale at a major midwestern rubber plant, was designed by engineers of the Richardson Scale Co.

Seiberling Sales Shifts

Three new assignments in the Seiberling Rubber Co. sales organization have been announced by L. M. Seiberling, vice president in charge of sales.

John A. Reid, assistant manager of truck tire sales since 1949, will fill the newly created position of assistant manager in the company's Chicago sales district.

A. J. Cheponis comes to Akron as manager of the company's budget sales department, and George W. Robinson, advertising and merchandising, becomes assistant manager of his department.

Reid joined the company in 1945 as a truck tire engineer in the Atlanta, Ga., district and was transferred to the main office in Akron four years later. Previously he had held sales positions with the Firestone Tire & Rubber Co. and The B. F. Goodrich Co., from 1925 until 1942, when he joined the OPA as a business analyst in Washington, D. C., later becoming a regional tire rationing officer.

Cheponis has been with Seiberling since May, 1946, when he started in the Philadelphia, Pa., district office as budget supervisor. For the past five years he has been a salesman in that district.

Robinson joined Seiberling's merchandise distribution department in August, 1941, and was assigned to the advertising and merchandising department in October, 1951. Previously he had been employed by the Lake Theater Corp. and the Diamond Match Co.

J. Fred Seiberling, a 22-year employe of the company, has retired from his position in the government sales department. Seiberling, oldest son of the company founder, F. A. Seiberling, joined the firm in October, 1931, as a commercial salesman in Chicago, Ill. Although most of his 22 years with the Seiberling organization was in government sales, he was formerly manager of dealer relations and in manufacturers' sales. During World War II he was manager of the company's Washington, D. C., office, handling sales to the Armed Forces. Before joining Seiberling Rubber, he had been with The Goodyear Tire & Rubber Co. three years and was also with the former Seiberling Rubber Co. plant in New Castle, Pa., one year.

Forms New Mechanical Division

Haartz-Mason, Inc., Watertown, Mass., manufacturer of coated fabrics for 26 years, has formed a new mechanical products division to manufacture precision molded diaphragms and rubber coated fabrics for a variety of industrial applications. Primary product development efforts will be for the automotive, aviation, gas, and petroleum industries.

T. H. McConnell, Jr., former supervisor of sales for Vulcan Rubber Products, Inc., will serve as general manager of the division.

Phthalic Anhydride Plant

The Barrett Division, Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y., has announced that its recently completed $5,000,000 Chicago phthalic anhydride plant is in full operation. The facility has a capacity which, when added to that of a similar installation soon to be completed in Philadelphia, is expected to eliminate the possibility of short supply of the chemical for some years to come.

Noble with General Latex

General Latex & Chemical Corp., 666 Main St., Cambridge, Mass. has announced that Royce J. Noble, author of "Latex In Industry," has joined its staff as a consultant in latex matters. Dr. Noble has been associated with the latex industry for many years and has served as a consulting engineer in the technology of rubber and latex since 1931. In 1942 he was given the rank of colonel in the Chemical Corps of the U. S. Army, Chief of Engineering Division, Technical Command, Edgewood Arsenal and he was also adviser to the Bureau of Ships, U. S. Navy, in the manufacture of microporous synthetic rubber products. Dr. Noble is a member of American Chemical Society and American Institute of Chemical Engineers and is a Fellow of the Institution of the Rubber Industry. He is also the author of several publications, patents, and papers.

Walker Laboratory Manager

Donald F. Walker has joined the executive staff as laboratory manager. He became associated with the Dunlop Rubber organization at its Toronto plant in 1935 and until 1949 was actively engaged in foam latex work, both in factory control and development of foamed latex processes. During the war years he brought to production stages certain essential military developments in rubber latex. He also brought synthetic latex into successful use in foam sponge applications. Since coming to this country from Canada in 1949, Mr. Walker has had a varied and intimate practical experience in foam latex. He is a member of the Canadian Institute of Chemistry and a past chairman of its Ontario Rubber Section.

Sales Staff Changes

The board of General Latex also announced the appointment of Frank D. Andruss as vice president in charge of sales.

Richard V. Does recently joined the company's executive staff as sales administrative assistant. From 1942 to 1947 he served as administrative assistant to the Deputy Director, Sales and Distribution, Office of Rubber Reserve, Reconstruction Finance Corp., and in 1947 went to Charles T. Wilson Co. as technical sales representative. From 1950, until he joined General Latex, he was with Wild & Stevens, Inc., printing roller manufacturer and later with Godfrey L. Cabot, Inc., research laboratories. Mr. Does belongs to the Division of Rubber Chemistry, A. C. S., the Boston Rubber Group, and the Elastomer & Plastics Group of the Northeastern Section, A. C. S.

Controllers Institute, 1 E. 42nd St., New York 17, N. Y., recently elected as vice presidents of its New York City Control, H. M. Kelton, treasurer of United States Rubber Co., and Allen H. Ottman, vice president and a director of American Hard Rubber Co. At the annual meeting of the Institute's New Orleans Control, J. M. Stonnell, comptroller, Copolymer Corp., was named a director.

David K. Usher, assistant manager of the Airfoam division at Goodyear Tire & Rubber Co., has been named to attend a three-month course in advanced management training in the Graduate School of Business Administration at Harvard University.

Cooper Tire Expanding

At a recent board meeting of Cooper Tire & Rubber Co., Findlay, O., Edward E. Brewer was elected vice president in charge of industrial rubber products, a new office to handle the expansion program of the division, which manufactures molded and extruded goods, mostly for automobile and home appliances.

The expansion program includes a new building, now about complete, providing 13,000 square feet of factory space. Additional new equipment has also been purchased and installed.

R. H. Davis will continue as general manager of the division, in charge of the sales expansion program. He has been with the company since 1939.

Mr. Brewer, following his military service, attended Purdue University and after graduating in 1949 joined the Cooper company.

At the board meeting President W. B. Brewer revealed that net sales for the first half this year were about 50% higher than a year ago. He believes, further, that the company's current high rate of production will continue throughout the fall and winter. Besides increased sales in its regular items Cooper has made a very large amount of defense products, including tires, tubes, and inflatable goods.

Materials Handling Clinic

The second in a series of traveling clinics on material handling scheduled for 1953 by the Material Handling Institute will convene October 2 at the Sheraton-Plaza Hotel, Boston, Mass., at the request of and in cooperation with the New England Chapter of the American Material Handling Society.

The purpose of the traveling clinics, the first of which was held in New York, N. Y., June 10, is to develop among users a better understanding of the correct application of material handling equipment to industry's problems.

The Boston clinic will be an all-day meeting, divided into five separate panel discussions, meeting concurrently, according to the problems presented. Each panel will have a specialist in each general type of material handling activity, including industrial gasoline and electric trucks, powered hand-trucks, storage batteries and accessories; overhead and monorail cranes and hoists; conveyors; floor and hand-trucks and wheel and castor equipment; and pallets, steel wire and strapping.

Others clinics are being planned in the future for the major industrial centers of the country.

Adds to Sales Staff

Dewey & Almy Chemical Co., Cambridge, Mass., announced August 4 that its container division is adding three salesmen—Frederick M. Byerly, who will assist in sales of cap and industrial sealing compounds; Edward J. McKearney, who will work with can sealing compounds; Robert C. Dewey, who will take the division's sales training course.

Mr. Byerly was formerly a salesman for Unexcelled Chemical Corp. and Eagle-Picher Co. in New York.

Mr. McKearney was formerly with the Connecticut Hard Rubber Co. Mr. Dewey was recently discharged from the Marine Corps.

Expands Tire and Tube Plants

A $9,000,000 expansion at the tire and tube manufacturing plant at Oaks, Pa., of The B. F. Goodrich Co., Akron, O., has been announced as already under way. Completion in late 1954 is expected, and production from the expanded facilities will be of capacity equal to or greater than any of BFG's four other tire and tube plants. The new additions, fifth since the plant was built, include plans for building the company's tubeless tire.

Goodrich later announced a $4,500,000 expansion under way at its Tuscaloosa, Ala., tire and tube manufacturing plant, also to be completed in late 1954. This expansion will boost the plant's production capacity by 30%. Additional basic machine capacity for mixing is being provided as well as additional end-product capacity.

The first tire rolled off the Tuscaloosa plant's production line in October, 1946. A tank lining department was established in 1949.

A $120,000 brick and steel addition to the company's distribution center at 960 S. Bellevue St., Memphis, Tenn., will increase warehouse area by 20,800 square feet, bringing the overall warehouse area to more than 65,000 square feet. It is estimated tire storage facilities at the new unit will be increased to accommodate some 35,000 additional tires. The new unit will also contain enlarged rail and truck facilities.

The present building was acquired by Goodrich in February, 1949.

Tires and auto and home supplies are stocked at the distribution center which presently serves the company's Memphis district. When the addition is completed in about four months, the unit will also service the company's New Orleans district.

Tubeless Tire Production

Production of tubeless tires is currently at an all-time high, according to W. S. Richardson, Goodrich executive vice president, with more than 2,000,000 units having already been delivered to motorists. Present production rates in the company's plants are double those of last year.

It was also reported that tubeless tires have made the greatest sales gains of any tire on the replacement market. While unit sales of all makes of car tires increased 34% in 1952, tubeless tires gained 90%. It was estimated that the tires have carried motorists more than 12,000,000,000 miles since their introduction in 1947.

Laboratory Computer Service

Burroughs Corp., Philadelphia, Pa., has announced the availability of high-speed computation services, through use of the company's laboratory computer, to business, industrial and research organizations. The computer is an electronic digital unit which features magnetic drum memory systems, punched paper tape input and output facilities, and extensive checking circuits to avoid error.

P. W. Stansfield has been named manager, industrial tire sales, for The B. F. Goodrich Co. Tire & Equipment Division. Mr. Stansfield, who entered the rubber industry in 1917, joined The B. F. Goodrich Co. in 1936. In 1939 he was named to head up the retail sale of farm tires and in October, 1947, moved to passenger-car tire sales.

Synthetic Rubber Safety Record

Establishment of a new world's record for the synthetic rubber industry has been achieved by the Port Neches, Tex., synthetic rubber plant, built and operated for the government by B. F. Goodrich Chemical Co., Cleveland, O. The plant has recorded 3,551,981 manhours (1,281 days) worked without a lost-time accident. This performance has earned for the plant permanent possession of the President's Cup, the company's safety award. The plant had won the cup three times before, in 1950, 1951, and 1952.

Vinyl Covering for Tote Baskets

Tote baskets used as carriers and as protective racks for jet engine compressor blades are coated with a vinyl plastisol made from Geon paste resin, product of Goodrich Chemical. The plastisol was formulated by Stanley Chemical Co., East Berlin, Conn., in an attempt to provide the baskets with protection against the extremely corrosive effects of trichloroethylene degreasing baths used in the blade manufacture. It has been found that the coating also provides a hard, slick, and durable covering which facilitates rapid drain-off and minimizes carry-over of the bath fluid.

In coating the basket with the plastisol, the object is first covered with a Stanley primer to a thickness of at least 1½ mils. After this primer has been baked for 10 minutes, the basket is immersed for 20-30 seconds into the plastisol and then baked for 30 minutes, minimum. Accurate temperature control is required in the last baking operation.

Shell Chemical Staff Changes

Leo V. Steck, marketing vice president of Shell Chemical Corp., New York 20, N. Y., last month announced a recent series of changes in his staff.

J. J. Lawler, formerly district manager in Chicago, takes up new duties as sales manager for the company's Julius Hyman & Co. Division in Denver, Colo., after a brief period on the marketing staff in New York. Mr. Lawler started his Shell career at St. Louis in 1937.

J. K. Robbins, district manager at St. Louis, replaces Lawler as Chicago district manager. He returns to Chicago after many years' experience selling chemicals in the Midwest.

W. C. Lowrey, manager of the eastern division solvents department in New York, becomes district manager at St. Louis.

A. P. Howe, senior technical salesman at Chicago, goes to San Francisco as western division chemical products manager.

William Q. Mooney is now manager of marketing's new employe development department. He formerly was manager of the marketing service department in the eastern division. He began work with Shell in 1929 as a clerk at Long Island City and has also served at Brooklyn, Hartford, Boston, and other New England and eastern seaboard centers.

Mr. Steck also announced that, effective October 1, W. E. Keegan, who has spent the last year as his assistant on staff work, returns to sales management activities as assistant to the sales manager of Shell Chemical's eastern division. Mr. Keegan came to New York from Detroit, where he was district manager. Previously he had been salesman in the Philadelphia and the New York areas.

Firestone Succeeds Shilts

A change in the official organization personnel of Goodyear Tire & Rubber Co., Akron, O., places Arden E. Firestone, attorney and assistant secretary of foreign operations, in the post of secretary of the company.

W. D. Shilts, secretary for the past 27 years, is relinquishing the office at his own request and will continue with the organization in fields of special assignments.

Firestone was a partner in the Akron law firm, Hutchinson & Firestone, from 1932 to 1942, when he joined Goodyear as an attorney in the law department. He was appointed assistant secretary of foreign operations in 1947.

Shilts joined Goodyear's sales organization in 1905 and was elected assistant secretary of the company in 1919 and secretary in 1926.

Kiel Chief Chemist at Gadsden

E. W. Kiel has been appointed chief chemist of the plant in Gadsden, Ala. He comes from Jackson, Mich., where he is being replaced as chief chemist of Goodyear's plant by M. G. Atkinson.

Kiel started with the company as a factory office trainee in Akron in 1941. He subsequently served as physical laboratory operator and junior development compounder before moving to Gadsden in 1947 as development section head. He was transferred to Jackson as chief chemist in 1948.

Atkinson has spent his entire Goodyear career in Jackson since joining the company in 1937. He has held a number of important chemical assignments and in 1946 was promoted to compounder.

Research Lab Anniversary

The tenth anniversary of the dedication of Goodyear's research laboratory and of the transfer of the company's technical library to the laboratory was observed this summer. In the library the research personnel consisting of 200 chemists, physicists, and engineers have available some 8,000 volumes in the rubber and chemical fields.

Litchfield Honored on Birthday

More than 250 Akron men and women, including executives of rubber companies in the area, attended a dinner at Akron City Club, July 27, to honor P. W. Litchfield, board chairman at Goodyear, on his seventy-eighth birthday. The dinner was sponsored by the Akron Women's Chapter, National Aeronautic Association, in which Mr. Litchfield has long been interested. Ralph S. Damon, president of Trans World Airlines and a director of Goodyear, was the principal speaker.

Pliofilm Shower Caps

Lightweight, disposable, transparent shower caps are being made of Pliofilm, product of the Goodyear company, by Cleenz Chemical Co., Brooklyn, N. Y. The caps are intended for home, hotel, and motel use to protect women's hair and make-up against water. The water-repellent products will be custom packaged for quantity orders in cartons, in units of three, and in individual envelopes.

Frederick E. Traflet, vice president and a director of Pequanoc Rubber Co., Butler, N. J., recently was elected to the board of Bishop Mfg. Corp., Cedar Grove, N. J.

Opposes Freight Increase

The National Association of Waste Material Dealers, Inc., 271 Madison Ave., New York 16, N. Y., in a brief filed by its Traffic Committee with the Interstate Commerce Commission and the railroads, is opposing the carriers' petition to make currently temporary increases permanent. NAWMD's position is that the original temporary freight increase was opposed by the waste material industry prior to its becoming effective.

Seminars on Salvage and Disposal

Officers and personnel of the United States Army will attend two seminars to be held in Chicago and Los Angeles by the Institute of Scrap Iron & Steel, Inc., and NAWMD, for the purpose of acquainting salvage and disposal officials of the Army with the basic functions of scrap firms. In this way it is hoped that proper utilization of scrap will be effected.

More than 300 officers and personnel are expected to attend the seminars, which will consist of lectures, motion pictures, and question-and-answer sessions. The Chicago course will be held September 14-18 and the Los Angeles session October 12-16. Both sessions will be similar in content and both will deal, in part, with scrap rubber and plastics.

Scrap Rubber Institute to Meet

The Scrap Rubber & Plastics Institute, NAWMD, will meet November 18 as part of the Association's fall meeting on November 13-18 at the Hollywood Beach Hotel, Hollywood, Fla. The general meeting will include sessions of the Association's other commodity divisions, as well as a banquet, President's party, golf tournaments, and other activities.

Blimps Being Constructed

An unspecified number of non-rigid airships, similar to the K-type airships used in World War II, but more modern and streamlined in construction, are being built for the United States Navy by Goodyear Aircraft Corp., Akron, O. Intended for anti-submarine service, the ZP4K crafts have speed of around 65 knots, but can maintain very low speeds or hover if necessary. The envelope of the blimp is made of neoprene coated cotton and has a capacity of 527,000 cubic feet of helium gas.

The lighter-than-air craft is manned by a crew of eight and is driven by two 11½-foot reversible propellers. The landing gear consists of one fully retractable wheel with a tire of 10-ply nylon construction. The conventional fin configuration on the stern of the blimp has been maintained. New features of the ZP4K are an inflight refueling system and a water pickup system for ballasting.

Shawinigan Products Corp., 350 Fifth Ave., New York 1, N. Y., has been appointed exclusive sales agent in the United States for natural rubber latices manufactured by Revertex, Ltd., London, England. Among the grades handled will be Standard Revertex, 72% solids, and a prevulcanized latex which will air-dry to a vulcanized end-product. Stocks of rubber latex in drums are maintained in a warehouse in Brooklyn, N. Y., and larger shipments can be arranged from the Far East.

Thomas P. True Richard F. Loges

Adds to Sales Staff

John M. Hamilton, vice president, Binney & Smith Co., 41 E. 42nd St., New York, N. Y., has announced two appointments to its sales staff.

Thomas Perry True, who joined the company during June after completion of his military service, will cover northern New Jersey from the New York office and will handle all Binney & Smith lines for the rubber, paint, ink, and related industries.

Richard F. Loges has been added to the Akron office and handles all Binney & Smith products used in the rubber, paint, and ink fields. He recently completed a tour of duty with the U. S. Marine Corps. He was formerly connected with Sherwin Williams, also in a sales capacity.

Stalwart Buys Georgia Plant

The Stalwart Rubber Co., Bedford, O., has purchased Jasper Rubber Co., Jasper, Ga. This acquisition involves one-half million dollars and is another step in Stalwart's expansion program to facilitate the production of custom engineered rubber parts for industry.

The Jasper plant was chosen for its strategic position in serving southern industry and will extend Stalwart services throughout the South. It will also add approximately 25,000 square feet to company facilities.

Stalwart's president, H. W. Osborn, said the Jasper plant will be operated as a subsidiary of the parent organization. Its management will be handled by the following executives: H. W. Osborn, president; A. W. MacAlonan, vice president in charge of sales; W. P. Lindauer, vice president in charge of research; S. C. Gartrell, vice president; E. H. Osborn, treasurer; and F. K. Byers, Jr., secretary. John Kravetz has been transferred from Bedford to Jasper as factory manager. In addition, Everett Atherton, of Jasper, will be in charge of offices and personnel; while James Ingram, also of Jasper, will be responsible for all equipment and maintenance as chief engineer.

The purchase of the Jasper plant rounds out a four-year expansion program which began with the construction of separate production facilities for the manufacture of silicone rubber parts to avoid contamination from other rubbers. In late 1951 new storage warehouses were added to Stalwart's holdings, and in early 1952 new equipment was purchased for the establishment of the molding division. These facilities were added to in late 1952.

Stalwart custom fabricates rubber products from natural, synthetic, and reclaimed rubbers.

The Jasper plant, like the Bedford one, will be equipped to mold and extrude rubber parts to specifications.

Cabot Research Men Advanced

Godfrey L. Cabot, Inc., Boston, Mass., carbon black and chemicals manufacturing firm, has appointed Walter R. Smith and E. M. Dannenberg associate directors of research, and Randolph Antonsen manager of research. These men will serve with Charles A. Stokes, director of the Cabot research and development department in Cambridge, Mass.

Dr. Smith, chief research chemist of the company since 1936, will continue to direct the activities of the basic research section. He is a member of the American Chemical Society, Society of Chemical Industry, American Institute of Chemists, and the Electron Microscope Society of America.

Mr. Dannenberg will remain head of the applications research and technical service section. He has been a member of the Cambridge research and development department since 1945, following several years of chemical research experience in the clay, electrical, and plastics industries. He belongs to the divisions of Rubber and Colloid Chemistry, A. C. S.; American Institute of Chemical Engineers; Boston Rubber Group; Society of Plastics Industry; and the American Society for Testing Materials.

Mr. Antonsen, head of the process design and economics section, entered the Cabot organization in 1945 and was plant manager of a subsidiary company for two years before joining the research and development department as liaison engineer in Boston. He is a member of the AICE and is chairman of its Boston Section.

Cabot later announced also that Hertha Bienes, Gregory Berstein, and Thomas H. Goodgame had recently joined the staff of the research and development department.

Miss Bienes, fundamental research section, received her B.A. from Hunter College in 1951 and then became research assistant at Amherst College, specializing in adsorption studies.

Mr. Goodgame, applied research section, received the degree of B.S. in chemical engineering in 1942 from Louisiana Polytechnic Institute and his M.S. in chemical engineering in 1947 from Louisiana State University and has completed three years of graduate study at Massachusetts Institute of Technology.

Mr. Berstein, senior chemist in the pigments application group, was graduated in industrial chemistry from the Technical University, Vienna, Austria, in 1932. For the past 11 years he was actively engaged in the New England paint manufacturing industry as a chief chemist. He is a member of the New England Paint & Varnish Production Club.

Amon Returns from Abroad

Fred H. Amon, technical director of Godfrey L. Cabot, Inc., recently returned from a trip to England and Scotland where he visited various rubber manufacturing firms and held technical discussions with their representatives. Recent developments on the use of the newer oil furnace blacks in natural rubber were considered at these meetings.

In particular, Mr. Amon was concerned with possibilities for increased applications in British industry of oil furnace blacks produced by Cabot Carbon, Ltd., a subsidiary of the Massachusetts firm, and with further diversification of plant production. The British company recently expanded its manufacturing facilities, doubling its production capacity for high reinforcing oil furnace blacks.

Conveyor Belt Lasts 64 Years

A grain conveyor belt, reported to have been operating continuously for 64 years, has finally been retired. The belt was made in 1889 by New York Belting & Packing Co., Passaic, N. J., and is said to be one of the first cotton duck and rubber belts to be used for industrial hauling.

The 24-inch wide belt will be sent back to the plant of the manufacturer to undergo laboratory tests. It was replaced, although still claimed to be capable of several years of useful service, in conjunction with major construction changes being made on the grain elevator.

Sales Staff Changes

New York Belting & Packing last month announced three changes in its district sales organization.

William I. Butler, manager for the southeastern district, with offices in Memphis, has been named district manager for the east central states with offices in Cleveland. His former post will be filled by William W. Conard, district manager for the southeastern states with L. H. Gilmer Co. before it merged with New York Belting & Packing a year ago. Mr. Conard will make his headquarters in Atlanta.

Malcolm B. Roach, sales engineer, has been appointed assistant manager for the southwestern district, with headquarters in Dallas.

Firestone Advances Lyon

Promotion of W. E. Lyon to the position of director of tire engineering and development was announced last month by Raymond C. Firestone, vice president in charge of research and development of The Firestone Tire & Rubber Co., Akron, O.

J. J. Robson, formerly manager of tire engineering, has taken on additional duties as manager of tire engineering and development.

M. P. Hershey has been named manager of the department in charge of passenger, airplane, racing, and special product tire design.

T. A. Robertson is now manager of the department in charge of truck, bus, tractor, implement and earth-mover tire design.

K. W. Brandau has been made manager of the development compounding department.

P. D. Bowers has been appointed manager of the service compounding department.

G. H. Wallace has become manager of the analytical laboratory division.

Mr. Lyon joined Firestone in 1929 and in 1940, after 11 years in the tire engineering department, was named manager. In 1950 he became manager of tire development.

Mr. Robson started with Firestone in 1932 and served in the engineering department in Akron until World War II. From 1946 until 1949 he was manager of the West Coast division of the manufacturers sales department and since 1949 has been in Akron as manager of tire engineering.

Synthetic Rubber in Asphalt

Research at the University of Kentucky has indicated that the use of a new synthetic latex compound in asphalt road paving mixtures results in longer life expectancy for those roads paved with the mixture than for those paved wih conventional asphalt. The synthetic rubber compound, a product of the Firestone company,

W. E. Lyon

is reportedly a low-cost latex material different from any rubber heretofore used in asphalt road tests. The tests on different types of rubberized pavement which have led to this announcement have been conducted by the University under a research contract from Firestone.

New Sales Agents

W. David Anderson and Hal P. Headley have formed a partnership known as Summit Chemical Co., with offices at 1044 S. High St., Akron, O. They will be manufacturers' agents and distributors for chemicals and other materials used in the rubber industry.

Mr. Anderson opened an office for Godfrey L. Cabot, Inc., in Akron in 1941 and was the local manager for the next ten years. He represented the same company in New York, since leaving Akron in 1951.

Mr. Headley has been with the B. F. Goodrich Co. for the past 17 years and has worked in the research, tire construction and tire compounding development and technical factory compounding groups. He has served in the Akron, Los Angeles, Oaks, and Swedish factories.

Boston Woven Hose Warehouse

Boston Woven Hose & Rubber Co., Cambridge, Mass., opened a new warehouse at Atlanta, Ga., as part of a far-reaching program designed to enable southeast customers to receive 24-hour service and delivery of Boston products.

According to Frank Dashiell, manager of Boston's southeastern division, the warehouse, at 685 Metal Rd. N.E., will service all major locations in the southeast covered by Boston's resident salesmen at Atlanta: Orlando, Fla.; Birmingham, Ala.; Columbia, S. C.; Knoxville, Tenn.; and Richmond, Va.

Terry Hayden has been appointed manager of the warehouse, which will stock a complete line of company products including conveyor, elevator, and flat transmission belts, V-belts, industrial hose, fire hose, tubing, packing tape, matting, stair treads, and garden hose.

It was also announced that Boston will open another regional warehouse at Dallas, Tex., in the very near future.

Expand Styrene Production

Monsanto Chemical Co., Springfield, Mass., has announced plans to increase its production capacity of high-impact styrene by 30,000,000 pounds a year. Completion and operation of the new facilities are expected within eight months.

The trend toward greater use of high-impact styrene and the requirements of molders for high-grade styrene compounds are reported to be the factors which decided the company to take this step of expanding its Lustrex production.

New Sales Representatives for Plastics

Two members of the plastics division have been promoted to sales representatives for industrial resins. They are James F. McKeon and Warren J. Clark, who have been assigned to branch offices at Cincinnati and St. Louis, respectively. The products they will handle include laminating resins and foundry resins.

McKeon joined Monsanto in 1940 and became a member of the sales department in 1951.

Clark has been with Monsanto since 1952.

Studies Shock and Vibration

A new division of Foster D. Snell, Inc., 29 W. 15th St., New York 11, N. Y., has been formed for the primary purpose of studying shock and vibration and their effect on packaged and unpackaged instruments and delicate equipment. The company has developed a drop tester for this purpose which can reportedly determine the fragilities of instruments.

The Snell drop tester simulates the rough-handling conditions which produce the most severe shock loads and frequencies encountered in transportation. It is reported that the maximum acceleration at any duration of impact which the item can take without impairment of function can be determined by the tester. Cushioning, transmissibilities, and dynamic damping coefficients may also be obtained, within practical limits, by a procedure utilizing this machine.

Purchases Hale Rubber Co.

Gro-Cord Rubber Co., Lima, O., has acquired Alfred Hale Rubber Co., North Quincy, Mass. The latter, established in 1837, is one of this country's oldest manufacturers of soling materials for the shoe manufacturing industry. Hale's quality product line will be maintained, although the range of materials will be expanded at an early date. Its trained personnel and factory facilities will continue in use.

Officers of Alfred Hale Rubber Co., Inc., are: president, Forest Moor; chairman of the board, Fred W. Cook; vice presidents, Harold Smith and David C. Cutler; vice president and sales manager, James S. McKindsey; secretary-treasurer, Winston L. Hunt; assistant treasurer, Albert Hocknell; assistant secretary, Melvin C. Light.

Thermomat Co., Inc., Trenton, N. J., manufacturer of radiant panels for industry, has appointed Wyrough & Loser, 143 E. State St., Trenton, manufacturer's representative.

Westfall in New Post

James C. Westfall has been named assistant to Ernest G. Brown, vice president and general manager, mechanical goods division, United States Rubber Co., Rockefeller Center, New York 20, N. Y. Mr. Westfall, since 1947 assistant superintendent of the belting department in the company's Passaic plant, is headquartered at the company's main office. He started with a Cleveland subsidiary of U. S. Rubber in 1929 and later was transferred to Passaic, where he became manager of the sales-production coordination department in 1935. Next, he went to the belting department.

Moves Section of Textile Division

The production management section of the textile division has moved from New York to Winnsboro, S. C., to permit better coordination between the production management section and the division's seven southern plants.

The following are moving to the new location: R. C. Harrington, production manager; W. W. Watkins, chief engineer; J. E. Sullivan, manager of industrial relations and labor standards; R. R. McGee, planning engineer; L. D. Swearingen, manager of technical service; J. W. McSwain, consumer fabrics production supervisor; A. G. Quattlebaum, office manager; E. W. S. Calkins, fiber technologist; J. P. Harrison, assistant to planning engineer; D. M. Grieb, assistant to chief engineer, and W. L. Wylie, assistant to manager of industrial relations and labor standards.

Adds to Laboratories Staff

Nine technical men were recently added to the staff of the company's general laboratories at Passaic, N. J. They are: Frederick S. Dovell, B.S., University of Michigan; Arnold N. Johnson, Ph.D., Polytechnic Institute of Brooklyn; Henry F. Miller, M.S. in mechanical engineering, Stevens Institute of Technology; Daniel Shichman, B.S. in mechanical engineering, University of Michigan; Edward C. Smith, B.S. in electrical engineering, Massachusetts Institute of Technology; Charles W. Benjamin, B.S., Oberlin College; John Burkus, PhD., Duke University; Richard J. Farrell, B.Ch.E., MIT; and Theodore Shevcov, B.S., University of North Carolina.

International Division's Sales Changes

To provide even greater customer service and to develop more specialized selling techniques for today's markets, the sales department of the international division has been reorganized under the direction of a general sales manager and six managers, it was announced August 20 by L. C. Boos, vice president and general manager of the division.

G. J. Russ has been appointed to the newly created post of general sales manager and will be responsible for all sales activities. He will also integrate the department activities with those of staff departments and other divisions of the company.

Other new positions and the men appointed to them are: manager of branch sales, A. N. Reeves; manager of distributor sales, R. J. Thomas; manager of head office sales and government sales, A. Eaton-Clarke; and manager of product departments, W. J. Mulvihill, Jr. J. T. Kuntz continues as manager of sales development, and H. L. Reynolds as manager of sales operating.

"Overseas manufacturing, growth of markets, and improved communication and transportation demand more efficient and more specialized selling techniques," Mr. Boos declared. "Having these facts in mind, along with the never-ending need of excellent customer service, the new plan of organization has been adopted. We will continue to operate through the medium of product division, but the new sales staff has been set up to provide specialization in sales areas."

Sales Office Opened

U. S. Rubber has formally opened its Denver branch office at 4800 Colorado Blvd., Denver, Colo. Built to serve the Rocky Mountain area, consisting of parts of 10 states, the branch handles footwear and general products, U. S. tires, Fisk and Gillette tires, and mechanical goods of the company. The facilities are housed in a building which contains 84,000 square feet of area, including office and warehouse space.

New Sales Agent for Tapes

U. S. Rubber has appointed Earley Sales Co., 10 Hemlock St., Paterson, N. J., exclusive agent for the sale of electrical tapes to electrical wholesale distributors in the five boroughs of the City of New York, Long Island, Westchester, and northern New Jersey. In making the announcement, George J. Seel, manager, tapes sales department of U. S. Rubber's mechanical goods division, said this policy was new as applied to the New York area. The company normally sells its tapes under its own name directly to dealers.

Conveyor Belt Edges Capped

Conveyor belts used on underground coal equipment are being manufactured with an additional piece of tough rubber capping along the edges by U. S. Rubber. The belt edges receive extremely severe punishment in this application and often wear through the rubber cover to the inner belt fabric. When this wearing through happens, moisture and fine coal particles enter the fabric and cause rapid deterioration. The new capping, used on U. S. Giant conveyor belts, is an extra layer of rubber of special construction which guards against excessive wear.

Will Produce Ammonia

Columbia-Southern Chemical Corp., 420 Fort Duquesne Blvd., Pittsburgh 22, Pa., has announced its intention to construct an ammonia producing facility at Natrium, W. Va. Production is expected to begin by late 1954.

Ammonia will be manufactured by the direct combination of nitrogen with hydrogen under pressure in the presence of a catalyst. The hydrogen to be employed is obtained as a by-product of the electrolytic production of chlorine and caustic soda at the company's plant at the same location.

Fat-Splitting Package Plant

Blaw-Knox Co., Pittsburgh 22, Pa., has designed a package-type plant for the continuous splitting of fat by the Colgate-Emery process. The unit is reported to have a rated capacity of 500 pounds an hour, with yields up to 98%, and features easy erection, simple operation, and low operating costs. The fat-splitting column is unhoused and measures 65 feet high by five feet square. Accessories to the column require a building space 10 by 15 feet in area and 16 feet high.

The Colgate-Emery process employed is a counter-current, hydrolysis operation which yields free fatty acids and glycerine without using a catalyst. It is said to have operated successfully in larger sized plants (capacity, 1,500-7,500 pounds an hour) since 1947.

RMA Golf Outing

The third annual golf outing of the executive staff of The Rubber Manufacturers Association, Inc., New York, N. Y., held at the Westchester Hills Country Club in early August resulted in top awards for low gross for George Flint, tire division chairman, and for low net for R. R. Ormsby, vice president. Respective runners-up were C. P. McFadden, footwear division chairman, and J. J. Catterall, mechanical goods division chairman.

W. J. Sears, vice president, and Charles C. Miller, public relations director, scored first and second in the kickers handicap. In the accuracy contest, first and second prizes went, respectively, to Richard E. Vernor, of the Washington office, and George D. Freestone, assistant treasurer.

OBITUARY

L. M. Klinedinst

L. M. KLINEDINST, a former vice president and director of The Timken Roller Bearing Co., Canton, O., died in a local hospital on August 10 of a heart ailment.

Starting with the company in 1905, he rose to the position of vice president in charge of sales and director, which position he held when he retired in 1948. Mr. Klinedinst is credited with organizing and developing the industrial sales division of the Timken company.

Mr. Klinedinst was a member of the Society of Automotive Engineers, the Society of Military Engineers, the Army Ordnance Association, the Iron & Steel Electrical Engineers, the Automotive Old Timers Club, the Canton and the United States Chambers of Commerce, The Detroit Athletic, Congress Lake, Brookside Country clubs, and the Masons. Since his retirement Mr. Klinedinst was active as a civic leader in Canton, heading up the YMCA, Cancer, and Red Cross drives. Mr. Klinedinst was particularly interested in the physically handicapped and their placement in industry as productive workers.

The deceased is survived by his son, a brother, and two sisters.

Wm. R. Murphy

WILLIAM RAYMOND MURPHY, director of industrial relations at The Firestone Tire & Rubber Co., Akron, O., died at his home in Akron, July 20, after a brief illness. Requiem Mass was sung on July 23 at St. Vincent's Church followed by burial in Holy Cross Cemetery.

The deceased was born in Akron 63 years ago. He attended St. Mary's grade school.

At the age of 17 he went to work for the Firestone company, on March 16, 1907, and first divided his time between the time-keeping and the cost departments. Later Mr. Murphy went into time-study and employment work. Then in 1918 he was loaned to the United States Government to head the personnel and employment divisions of the Rock Island Arsenal. He returned to Firestone and its labor department, which had been started in 1913, and in 1919 became superintendent of labor for the company.

Mr. Murphy was always active in sports and was on company basketball and baseball teams. He also was president of the Firestone Twenty-Year Club since its inception in 1934.

Survivors include the widow, two daughters, and two sons.

Charles J. Geilfuss

CHARLES JOSEPH GEILFUSS, assistant general manager and factory manager for the General Asbestos & Rubber Division, Raybestos-Manhattan, Inc., N. Charleston, S. C., died suddenly on July 30 at his summer home on Sullivan's Island. Requiem Mass was said August 1 at St. Mary's Church, Charleston.

Mr. Geilfuss was born in Charleston, May 19, 1900. He attended the local high school and took night courses at the College of Charleston.

He saw service in World War I and was a supervising clerk in the accounting department at the Charleston Navy Yard from 1919 to 1927. Next he became plant manager for Raybestos-Manhattan.

The deceased was very active in civic affairs. He served on the Charleston City Council from 1940 to 1948 and acted as mayor pro-tem, was on the board of governors of the municipal airport, the City Parks & Playgrounds Commission, the Yacht Basin Advisory Committee, the Commissioners of Colonial Common and Ashley River Embankment. He was also a member of the Atlantic States Marine Fisheries Commission. He belonged to the Propeller Club, Port of Charleston; American Legion; the Elks; and the YMCA.

Survivors include the widow, a daughter, and a son.

Ernest G. Schick

ERNEST G. SCHICK, 70, Philadelphia district manager for Goodyear Tire & Rubber Co., from 1918 to 1941, died August 12 at Philadelphia following a long illness.

A native of Akron, Mr. Schick attended local grade and high schools and was graduated from Case Institute of Technology in 1903.

He was associated with a Barberton, O., firm before joining Goodyear's industrial products division as a salesman at Chicago in 1912. He was assigned to the company's manufacturers sales department, served as Cincinnati district manager and as a staffman in truck tire sales at Akron before being assigned to Philadelphia as district manager in 1918. Mr. Schick was relieved of his arduous duties as district manager and assigned to Pliofilm sales in Philadelphia in 1941, a position he held until his retirement in 1948.

He is survived by a daughter.

NEWS ABOUT PEOPLE

Kenneth N. Warner

Kenneth N. Warner has joined the research department of Emery Industries, Inc., Cincinnati, O., where he will be associated with the new chemicals department under the leadership of C. G. Goebel. Dr. Warner gained his research experience with National Aniline, The B. F. Goodrich Co., and Armour & Co. He is a member of the American Chemical Society.

A. E. Horn and **Richard J. Prentiss** have been elected directors of Nuodex Products Co., Inc., Elizabeth, N. J., manufacturer of chemical additives for the paint, textile, petroleum, plastic, and other industries. Mr. Horn is a former president of A. C. Horn Co. and vice president of Sun Chemical Corp. Mr. Prentiss is the founder and former president of Prentiss Drug & Chemical Co.

Harold E. Sponaugle has been transferred to the sales department of the tire machinery division of National Rubber Machinery Co., Akron, O. He formerly had served in the engineering department, with duties covering the design of tire machinery. Mr. Sponaugle has been with the company since 1947.

J. H. Carl Woodside and **Roy L. M. Weaver** have been appointed assistant advertising manager and advertising production head, respectively, by The B. F. Goodrich Rubber Co. of Canada, Ltd., Kitchener, Ont.

W. S. Harrison has been appointed manager, auto and home supply sales, for The B. F. Goodrich Co. Tire & Equipment Division, Akron, O., to succeed C. T. Morledge, now general manager, merchandising, for the division. Harrison joined Goodrich in 1931. In May, 1943, he resigned to become an assistant field director of the American Red Cross and saw service in the European theater. He rejoined BFG in January, 1945, as buyer-merchandiser, electronics, in the auto and home supply department. In April, 1947, Harrison was made buyer-merchandiser of refrigerators, freezers, and traffic appliances.

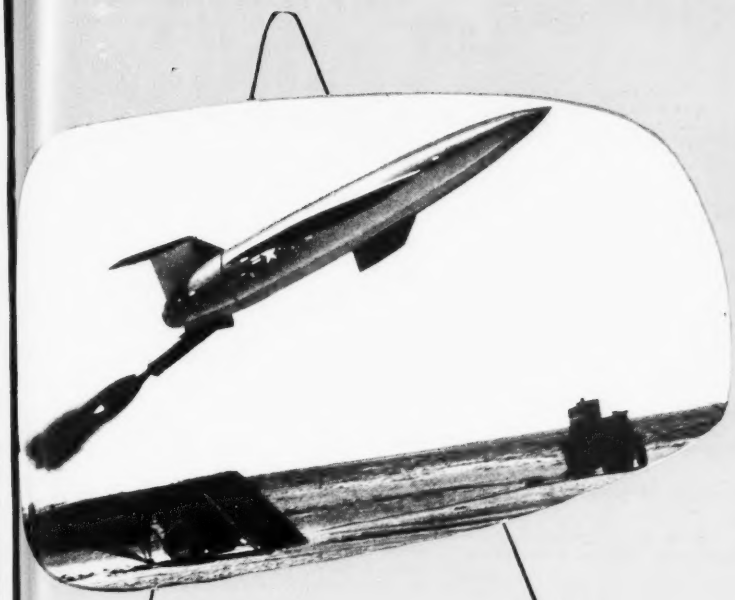
Irving Ash has joined The Baker Castor Oil Co., 120 Broadway, New York 5, N. Y., and will be responsible for sales development and will endeavor to expand still further the many uses for castor oil and its derivatives. He was formerly with Cello Film Corp. and is well known in the paint, varnish, and lacquer trade. He has had extensive experience in technical service and as plant chemist.

O. S. Dollison, vice president, will retire, effective October 1, from Lee Rubber & Tire Corp. He spent a number of years with The B. F. Goodrich Co. in Akron and Detroit before joining Republic Rubber Co., Youngstown, O., in 1922. After Republic was purchased by Lee Rubber & Tire in 1923, he stayed on and in 1926 was made sales manager. Later he became vice president in charge of sales, then vice president and general manager of the Republic Rubber Division. In 1950 he was elected a vice president of Lee Rubber & Tire Corp. For the past two years he has devoted a considerable portion of his time to hurrying to completion Republic's new plant for the production of Wiretex high-pressure hose. Mr. Dollison has long been active in the Rubber Manufacturers Association, Inc., serving as chairman of the mechanical division and the executive committee for two different terms.

Gilbert F. Stenger has been appointed manager, battery sales, for The B. F. Goodrich Co. Tire & Equipment Division. Stenger joined Goodrich in 1934 and has held a number of sales posts, including managership of the company's Miami, Fla., retail store. In 1948 he became assistant manager of accessories sales and in February, 1951, fleet sales manager of the truck tire sales department.

Arnold H. Smith, associated with Monsanto Chemical Co. for more than 30 years, recently retired under provisions of the company retirement plan. A native of Ohio, he was graduated in 1917 from the Armour Institute of Technology in Chicago. He joined Monsanto in 1922 as technical sales manager of the company's Rubber Service Laboratory, Akron, O. Then, in 1929, he went to London and was a director of the English affiliate from 1932 to 1940. He returned to the United States in 1940 and became director of the parent company's foreign department in 1945. He also served a year as acting managing director of Monsanto Chemicals (Australia), Ltd., before joining Monsanto Canada, Ltd., as president in 1948, his most recent post.

J. A. MacIntire, Jr., has been appointed assistant manager of wire braid hose sales for the Republic Rubber Division, Lee Rubber & Tire Corp., Youngstown, O. Mr. MacIntire comes to Republic with a background of nearly 25 years in the industrial rubber products business. Starting in 1928 as a salesman for L. H. Gilmer Co., he next spent 14 years with Quaker Rubber Co. in various sales executive positions. In June, 1951, he left Quaker, where he was then assistant to the vice president in charge of sales and merchandising manager, and spent the next year in Washington, D. C., in the Production & Requirements Branch of the Rubber Division of the National Production Authority.



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CRUDE RUBBER, SYNTHETIC RUBBER, SCRAP RUBBER, HARD RUBBER DUST, PLASTICS

M. C. Teague has been appointed president of Lock Thread Corp., 2832 E. Grand Blvd., Detroit 11, Mich., originator of self-locking thread fasteners. Dr. Teague brings to his new position a broad engineering background. He was administrative engineer over the initial ventilation and planning program for the Holland Vehicular Tunnel under the Hudson River. Subsequent vehicle tunnel plans have been based on this work. For the past 33 years Dr. Teague was associated with the United States Rubber Co. in the development, licensing, and sale of new products. Beginning in 1920 as a research chemist in the general development department, he later served as a sales manager for Naugatuck Chemical. In 1936 he was named director of the new products development department. In 1944, Dr. Teague became manager of the Luvon elastic fabric department, a position he held until 1950. For the past three years he was in charge of extensive developments in the use of latex in the footwear and general products division of U. S. Rubber. Dr. Teague holds many patents.

Edwin J. Lewis has been named manager, passenger-car tire sales, for The B. F. Goodrich Co. Tire & Equipment Division, and **Thomas I. Jenkins** has become assistant manager, passenger-car tire sales. Lewis has been with Goodrich for 23 years and has held a number of advertising, sales promotion, and sales posts. Prior to becoming manager of petroleum company sales in 1947 he had served as assistant to the manager of passenger-car tire sales.

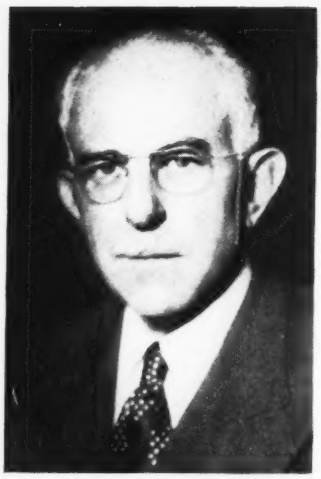
Jenkins started with Goodrich in 1925 and handled industrial tire sales for the company's automotive, aviation, and government division before becoming manager of industrial tire sales in 1947.

Robert W. Dunmire, since 1948 in charge of development operations for the canopy and laminates division at Goodyear Aircraft Corp., Akron, O., has been appointed acting division manager, to succeed **Robert S. Ames,** the recent recipient of an A. P. Sloan Fellowship calling for a one-year course of study at Massachusetts Institute of Technology. A member of engineering operations during the years he has been with Goodyear Aircraft, Dunmire joined the general design department in 1941, was assigned duties as an analyst in 1942, and two years later was appointed liaison engineer. He was transferred to the newly created research and development department in 1946 and two years later was named to head the canopy and laminates development section.

Leo T. Wilson is erecting a rubber part-finishing plant on N. Orange Ave., Brea, Calif. The structure will occupy a ground area of 50 by 120 feet.

J. Scott Brown has been appointed manager in executive charge of all activities at the Kankakee Ordance Works, Joliet Arsenal, Joliet Ill. This plant is operated for the Ordnance Ammunition Center by Naugatuck Chemical Division, United States Rubber Co. Mr. Brown formerly was chief engineer of the Division at Naugatuck, Conn. He joined U. S. Rubber in 1941 and served at the Williamsport, Pa., Ordance Works.

Fred N. Taff has been appointed acting chief engineer of the Division at Naugatuck; he had been the plant engineer.



J. H. Matthews

J. H. Matthews was appointed executive vice president of Raybestos-Manhattan, Inc., Passaic, N. J., at a board meeting on August 19. Mr. Matthews started with The Manhattan Rubber Mfg. Co. in 1914. He was appointed assistant factory manager of the Manhattan Rubber Division in 1940, became director of the company and assistant general manager of the Division in 1942, and in 1947 was elected a vice president of Raybestos-Manhattan. He is also vice president of The Canadian Raybestos Co., Ltd., Peterborogh, Ont., Canada; is in charge of the company's Wabash division at Crawfordsville, Ind., and the new Neenah, Wis., plant; and is a director of Kentucky Synthetic Rubber Corp.

Woodrow W. Halstead, for 17 years with The B. F. Goodrich Co. and now an associate of Dick Wheeler & Co., Detroit, has been retained by Yale Rubber Mfg. Co., Sandusky, Mich., as a consultant and field development engineer for Yale's special-purpose rubber extrusion products. Halstead is well known for his work in the development and designing of special-purpose rubber weather strips and similar items for the automotive and allied industries.

Robert L. Westbee has been elected a vice president of Minnesota Mining & Mfg. Co., St. Paul, Minn., and will head 3M's newly created electrical products division, which includes the electrical insulation and sound recording tape division, the Irvington Varnish & Insulator division, and the American Lava Corp., a wholly owned 3M subsidiary. Westbee joined 3M as a technician in 1933 and in 1940 was assigned to electrical tape engineering. He was named sales manager of the electrical insulation and sound recording tape division in 1944 and has been general manager of that division since 1948.

George Broughton has been appointed manager, fleet sales, for The B. F. Goodrich Co. Tire & Equipment Division. He started with the company in 1935 as a commercial salesman in its Rockford, Ill., retail store. He became a territory manager in the Chicago district in 1936 and was named manager of fleet sales, western division, in 1946. Moving to Cleveland in 1949 as wholesale supervisor, Broughton later became general supervisor in 1950.

Harry N. Roberts has been appointed manager of Goodrich brand petroleum company tire sales for The B. F. Goodrich Co. Tire & Equipment Division. Roberts joined the company in 1935 as a wholesale salesman in the Cleveland district; became wholesale sales supervisor in 1939 and general sales supervisor in 1941; in 1942 was transferred to the truck tire sales department in Akron; in 1943 entered Naval service, handling tire maintenance; and in 1946 returned to Goodrich as manager of battery and spark plug sales.

FINANCIAL

Allied Chemical & Dye Corp., New York, N. Y. January 1-June 30, 1953: net earnings, $21,719,447, equal to $2.45 a share, against $20,633,771, or $2.33 a share, in the 1952 period.

American Cyanamid Co., New York, N. Y., and subsidiaries. First six months, 1953: net earnings, $15,678,927, equal to $1.80 each on 8,634,726 common shares, against $14,855,920, or $1.71 each on 8,537,979 shares, a year earlier; net sales, $197,532,813, against $183,258,919.

American Hard Rubber Co., New York, N. Y., and wholly owned subsidiary. Twenty-four weeks to June 21, 1953: net income, $142,192, equal to 52¢ each on 273,609 common shares, against $123,334, or 45¢ a share, in the 24 weeks to June 15, 1952; net sales, $9,292,451, against $8,841,714.

American Zinc, Lead & Smelting Co., Columbus, O. Year ending June 30, 1953: net earnings, $2,028,006, equal to $2.51 a common share, compared with $3,397,654, or $4.54 a share, in the preceding fiscal year.

Anaconda Wire & Cable Co., New York, N. Y. Initial half, 1953: net earnings, $3,602,231, equal to $4.27 a common share, against $3,092,344, or $3.66 a share, the year before.

Baldwin Rubber Co., Pontiac, Mich. Year ended June 30, 1953: net income, $928,191, equal to $2.14 a common share, against $902,697, or $2.08 a share, in the preceding fiscal year.

Belden Mfg. Co., Chicago, Ill. Six months ended June 30, 1953: net profit, $732,351, equal to $2.28 a share, contrasted with $441,902, or $1.37 a share, in last year's half.

Borg-Warner Corp., Chicago, Ill., and subsidiaries. First half, 1953: net earnings, $10,845,200, equal to $4.41 each on 2,394,879 common shares, against $10,867,457, or $4.53 a share, in the first half last year; net sales, $202,550,961, against $185,202,424.

Brunswick-Balke-Collender Co., Chicago, Ill., and subsidiary. June half, 1953: net loss, $537,416, against net loss of $486,143 a year earlier.

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CIRCOMAR-110 A very low-cost soft asphaltum.	In the manufacture of tires.
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SUNOCO WAXES 1290 Yellow 1290 Brown Carefully refined microcrystalline waxes having a melting point of about 180 F.	As mold releasing agents.

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Brown Rubber Co., Inc., Lafayette, Ind. Six months ended June 27, 1953: net income, $564,538, equal to $1.50 each on 376,638 capital shares, compared with $453,421, or $1.20 a share, in the 1952 period.

Canada Wire & Cable Co., Leaside, Ont., Canada. June half, 1953: net earnings, $913,000, equal to $4.45 a share, contrasted with $1,022,000, or $5.08 a share, in the 1952 half.

Carborundum Co., Niagara Falls, N. Y. First half, 1953: consolidated net income, $3,385,665, equal to $2.19 each on 1,547,730 capital shares, compared with $2,490,658, or $1.63 each on 1,528,095 shares, in last year's half; sales, $43,799,761, against $35,825,663.

Philip Carey Mfg. Co., Cincinnati, O. Six months to June 30, 1953: net profit, $1,049,534, equal to $1.26 a common share, against $856,790, or $1.02 a share, in the 1952 half.

Cooper Tire & Rubber Co., Findlay, O. First six months, 1953: net profit, $366,695, equal to $2.34 a common share, contrasted with $164,150, or $1.05 a share, in last year's period.

Crown Cork International Corp., Baltimore, Md. Six months to June 30, 1953: net earnings, $403,732, equal to $1.04 a common share, against $295,905, or 76¢ a share, in the 1952 months.

DeVilbiss Co., Toledo, O. January 1-June 30, 1953: net income, $459,451, equal to $1.53 a common share, against $429,691, or $1.43 a share, in the 1952 months.

Columbian Carbon Co., New York, N. Y., and subsidiaries. First half, 1953: net earnings, $2,593,173, equal to $1.61 a common share, against $2,127,847, or $1.32 a share, a year earlier; sales, $27,003,189, against $22,988,609.

Circle Wire & Cable Corp., Maspeth, L. I., N. Y. Six months ended June 30, 1953: net earnings, $1,212,968, equal to $1.61 a common share, against $1,068,363, or $1.42 a share, in the like period last year.

Dewey & Almy Chemical Co., Cambridge, Mass. Initial half, 1953: net profit, $655,492, equal to 72¢ a common share, contrasted with net loss of $44,473 in the 1952 half; net sales, $16,176,113, against $12,493,443.

Diamond Alkali Co., Cleveland, O. Six months ended June 30, 1953: net earnings, $3,438,122, equal to $1.40 a common share, against $2,844,672, or $1.14 a share, in the corresponding period of 1952; net sales, $43,439,558, against $38,738,446.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. Initial half, 1953: net earnings, $114,758,444, equal to $2.41 a common share, against $101,708,123, or $2.12 a share, in last year's half.

General Tire & Rubber Co., Akron, O. June half, 1953: net profit, $3,482,750, equal to $2.73 a common share, against $2,946,246, or $2.30 a share, a year earlier.

Plymouth Rubber Co., Canton, Mass. Six months to May 31, 1953: net profit, $164,762, equal to 18¢ a share, compared with a net loss of $294,654 a year earlier.

B. F. Goodrich Co., Akron, O. January 1-June 30, 1953: consolidated net income, $16,874,655, equal to $4.03 each on 4,186,986 common shares, compared with $14,905,791, or $3.46 each on 4,158,316 shares, in the 1952 period; net sales, $350,385,793, against $297,278,822.

Goodyear Tire & Rubber Co., Akron, O., and subsidiaries. Six months to June 30, 1953: net income, $22,997,684, equal to $4.92 each on 4,378,264 common shares, contrasted with $15,480,369, or $3.21 each on 4,145,341 shares, a year earlier; net sales, $616,315,503, against $568,833,355.

National Rubber Machinery Co., Akron, O. June half, 1953: net income, $504,672, equal to $2.86 a share, compared with $285,134, or $1.62 a share, a year earlier.

New Jersey Zinc Co., New York, N. Y. June half, 1953: consolidated net income, $2,586,522, equal to $1.32 a common share, compared with $5,250,473, or $2.68 a share, in the like period last year.

St. Joseph Lead Co., New York, N. Y. First half, 1953: consolidated net income, $4,402,746, equal to $1.62 each on 2,716,222 shares, contrasted with $6,657,513, or $2.45 a share, in last year's half.

Skelly Oil Co., Kansas City, Mo. Second quarter, 1953: net income, $6,478,088, equal to $2.25 a common share, against $5,864,961, or $2.04 a share, in the same quarter last year.

Timken Roller Bearing Co., Canton, O. First half, 1953: net earnings, $6,061,601, equal to $2.50 a common share, against $5,968,877, or $2.46 a share, in the 1952 half.

United States Rubber Co., New York, N. Y. Six months to June 30, 1953: net profit, $14,440,347, equal to $2.23 a common share, compared with $12,956,461, or $1.95 a share, in the corresponding period of 1952; net sales, $453,870,165, against $443,491,316.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Armstrong Rubber Co.	Cl. A.	$0.50 q.	Oct. 1	Sept. 15
	Cl. B.	0.50 q.	Oct. 1	Sept. 15
	4¾% Pfd.	0.59⅜ q.	Oct. 1	Sept. 15
Borg-Warner Corp.	Com.	1.00 q.	Sept. 1	Aug. 12
Brown Rubber Co., Inc.	Com.	0.25	Sept. 1	Aug. 18
Brunswick-Balke-Collender Co.	Com.	0.25 q.	Sept. 15	Sept. 1
	Pfd.	1.25 q.	Oct. 1	Sept. 21
Canada Wire & Cable Co., Ltd.	Cl. A.	1.00	Sept. 15	Aug. 11
	Cl. B.	0.75	Sept. 15	Aug. 11
Carborundum Co.	Com.	0.35 q.	Sept. 10	Aug. 21
Cooper Tire & Rubber Co.	Com.	0.30 q.	July 31	July 20
Crown Cork & Seal Co., Inc.	$2.00 Pfd.	0.50 q.	Sept. 15	Aug. 18
E. I. du Pont de Nemours & Co., Inc.	Com.	0.85	Sept. 14	Aug. 24
	$4.50 Pfd.	1.12½ q.	Oct. 24	Oct. 9
	$3.50 Pfd.	0.87½ q.	Oct. 24	Oct. 9
Endicott Johnson Corp.	Com.	0.40 q.	Oct. 1	Sept. 21
	4% Pfd.	1.00 q.	Oct. 1	Sept. 21
Faultless Rubber Co.	Com.	0.25	Oct. 1	Sept. 15
Firestone Tire & Rubber Co.	Pfd.	1.12½ q.	Sept. 1	Aug. 14
Flintkote Co.	Com.	0.50 q.	Sept. 10	Aug. 27
	$4.00 Pfd.	1.00 q.	Sept. 15	Sept. 1
Garlock Packing Co.	Com.	0.25 q.	Sept. 30	Sept. 11
General Motors Corp.	Com.	1.00	Sept. 10	Aug. 10
	$3.75 Pfd.	0.93¾	Nov. 2	Oct. 5
	$5.00 Pfd.	1.25 q.	Nov. 2	Oct. 5
General Tire & Rubber Co.	Com.	0.50 q.	Aug. 31	Aug. 21
Goodall Rubber Co.	Com.	0.15 q.	Nov. 16	Nov. 2
	Pfd.	2.50 semi.	Nov. 16	Nov. 2
Goodyear Tire & Rubber Co.	Com.	0.75 q.	Sept. 15	Aug. 20
	Pfd.	1.25 q.	Sept. 15	Aug. 20
Lea Fabrics, Inc.	Com.	0.37½	Aug. 28	Aug. 7
Minnesota Mining & Mfg. Co.	Com.	0.25	Sept. 12	Aug. 22
	$4.00 Pfd.	1.00 q.	Sept. 12	Aug. 22
National Automotive Fibres, Inc.	Com.	0.50 q.	Sept. 1	Aug. 10
Phelps Dodge Copper Products Corp.	Com.	0.65 q.	Sept. 10	Aug. 13
Seiberling Rubber Co.	Com.	0.25 q.	Sept. 15	Sept. 1
	5% Cl. A. Pfd.	1.25 q.	Oct. 1	Sept. 15
	4½% Pr. Pfd.	1.13 q.	Oct. 1	Sept. 15
Sheller Mfg. Corp.	Com.	0.30 q.	Sept. 11	Aug. 12
United Elastic Corp.	Com.	0.60 q.	Sept. 10	Aug. 18
United States Rubber Co.	Com.	0.50 q.	Sept. 12	Aug. 24
	8% 1st Pfd.	2.00	Sept. 12	Aug. 24
Whitehead Bros. Rubber Co.	Com.	0.15 q.	Nov. 16	Nov. 2

Synthetic Fats

(Continued from page 782)

United States Department of Agriculture, New Orleans, La. Eight acetoglycerides or mixtures thereof, representing different degrees of acetylation, free hydroxyl content, and unsaturation, were tested as secondary plasticizers for vinyl chloride-acetate copolymer, using di-2-ethylhexyl phthalate, tricresyl phosphate, Santicizer 141, and dioctyl sebacate as the primary plasticizers.

Use of the fats with the first three plasticizers improved one or more plasticizing qualities, especially when tricresyl phosphate was the primary plasticizer. Results indicate that the fats are suitable extenders for dioctyl sebacate. Many more evaluations are needed to obtain more precise information on the potentialities of the fats for plasticizing vinyl and other resins. The acetoglycerides are being produced by a commercial firm, in cooperation with the Bureau of Agricultural & Industrial Chemistry, on a pilot-plant scale to obtain samples for evaluation.

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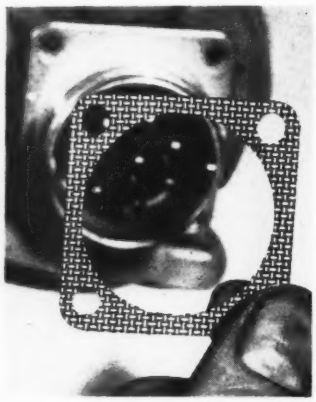
New Goods

Radio-Shielding Gasket Material

ALUMINUM wire screening whose interstices are filled with neoprene, product of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., has been introduced by the Vulcanized Rubber & Plastics Co., Morrisville, Pa., as a highly conductive gasketing material. Intended primarily for mounting electrical equipment in automobiles and aircraft, the material is buffed on both sides to insure uniform gage and smoothness and to expose the aluminum wire so that good electrical contact with the flanges can be made.



Aluminum Mesh-Neoprene Gasket

In addition to its conductivity, which reportedly permits the drainage of static electricity charges, the material is said to have the advantages of dimensional stability and resistance to deterioration. It can be supplied as cut gaskets or as uncut sheets 19 by 15 inches in size. Thickness as now supplied is 0.02-inch although other thicknesses can be made when required.

Solid Tire

A NEW solid heavy-duty tire, Innacush, has been introduced to the materials handling industry by United States Rubber Co., Rockefeller Center, New York 20, N. Y. The tires are specially designed for a split wheel that is tapered to 12½ degrees and that is slightly larger in diameter than the tires. These dimensions reportedly permit maximum compression when the wheel is bolted together. Bead wires constructed into the hard-rubber base are said to prevent tire stretch or slippage under severe operating conditions. Savings are claimed for users of the demountable Innacush due to the elimination of extra wheels, pressing charges, and special training for maintenance personnel, and to the reduction in changing time to 10 minutes or less.

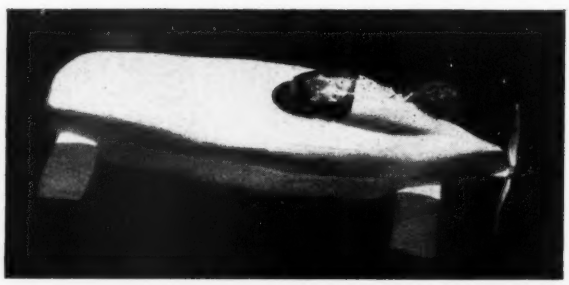
Tire for Field Changeover Purposes

High-Pressure Air Hose

BOSTON WOVEN HOSE & RUBBER CO., Cambridge, Mass., has announced the availability of a new high-pressure air hose for mining, tunneling, and construction work. The hose, called Concord Yellow Jack, is reported to be capable of withstanding working pressures as high as 2,000 psi.

Steel wire is used in the horizontal braided construction, and the product is covered with a specially compounded yellow cover for ready visibility. Unusual strength and ruggedness are said to be combined with extreme flexibility in the Yellow Jack. The hose is manufactured in eight sizes, ranging from ⅜-inch to 2½ inches inside diameter.

Swimmer Holding Aquaped above Head



Aerojet-General's Minisub in Operation

Underwater Propulsion Machines

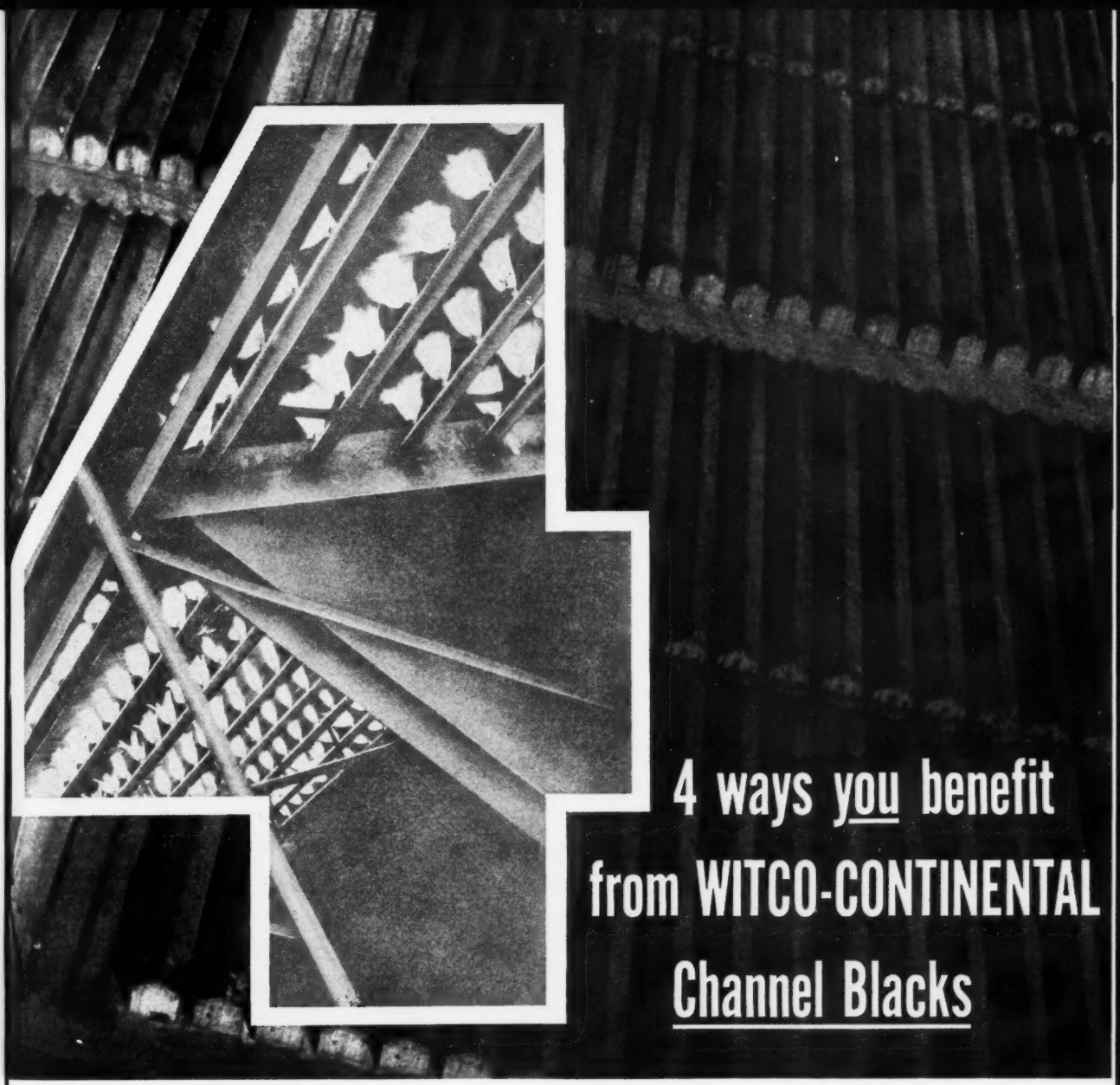
TWO devices intended for underwater exploration and demolition work, the Minisub and the Aquaped, have been developed by Aerojet-General Corp., subsidiary of The General Tire & Rubber Co., Akron, O. The former is a completely enclosed unit measuring 8½ feet long by 22 inches wide and weighing 145 pounds. It is driven by two 28-inch counter-rotating propellers activated by a ½-hp. motor or by foot pedals. The Minisub is completely flooded when in operation, a condition which makes its depth and period of submergence dependent on the limitations of the aqualung that the pilot must wear. Cruising speeds of five miles per hour on foot power or eight miles per hour with the motor operating are reported for the unit.

The Aquaped consists essentially of a long rod with pedals attached to the propellers through a gear box arrangement. Dubbed the swimming pogo stick, the unit is strapped on to the pilot, its uppermost part fitting between his thighs. Again, the limitations of this device are those of the pilot's breathing apparatus. The Aquaped is said to be capable of propelling the operator at speeds double that of normal underwater swimming rates.

Flexible Dielectric Sealer

A NEW dielectric sealer, designed for use as a flexible potting compound on electrical wiring connections, has been announced by Minnesota Mining & Mfg. Co., Detroit, Mich. EC-1120 is a synthetic rubber material which, when applied in liquid form, cures by chemical reaction to give a coating that reportedly retains its physical properties throughout a temperature range of —65 to 200° F., and has excellent dielectric properties, moisture and water resistance, and durability. The material also resists fuels and oils, and, owing to its flexibility, gives good protection against vibration.

EC-1120 Dielectric Sealer is supplied in two parts, the compound itself and the accelerator, which are mixed prior to use. The resulting mixture is a ready flowing, heavy liquid which can



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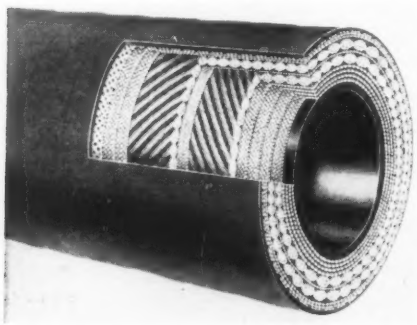
be applied with a putty knife or flow gun and which cures at room temperature with little shrinkage because of its high solids content (92%). When stored at temperatures below 75° F., the unaccelerated material has a shelf life said to be greater than one year. EC-1120 is available in container sizes from partial pints to gallons, with the proper amount of accelerator individually packaged with each container.



Cutaway Section of New Rotary Hose

Improved Rotary Hose

A NEW type of rotary hose, the Ray-Man CBL, which will reportedly withstand pressures of 5,000 psi., has been announced by Raybestos-Manhattan, Inc., Passaic, N. J. Constructed with a special cable-wire insert, the hose is contained in a synthetic oilproof rubber tube for drilling-in with oil or oil-base mud. Features claimed for the new product after field tests are extreme flexibility and strength with a high factor of safety, and a built-in streamline coupling with a Lip-Lok leak-proof seal.

Child Resting on Doll-Pillow; *at Right*, Sketch of Pillo-doll

Molded Foam Rubber Toy

A FOAM rubber doll-and-pillow combination, called Pillo-doll, is being manufactured by Fabrics, Inc., Montgomery, Ala., from rubber latex supplied by Hewitt-Robins, Inc., Stamford, Conn. The head and body of the product are molded in a single piece and covered with Sanforized percale. Overall measurements of both the pink girl doll and the blue boy doll are 8 by 14 inches. Both the foam, which is claimed to be non-allergic, and the cover are washable.

Improved Bicycle Tire

THE Goodyear Tire & Rubber Co., Akron, O., is marketing a new premium bicycle tire claimed to give cyclists easier pedaling, longer coasting, and maximum safety. Known as Super Eagle, the balloon tire features the use of a recently developed treatment for the ply fabric, new tread and sidewall compounds for rolling ease and flexibility, and a rounded tread contour and diamond design on the tread and shoulders for skid resistance on straight-away and turns. The product is available in one size, 26 x 2.125, with black or white sidewalls.

Tank Truck Hose

A NEW type of hose, designed for suction or discharge of petroleum products under pressure or vacuum, comes from Quaker Rubber Co., division of H. K. Porter Co., Inc., Philadelphia, Pa. Called the Quakflex Tank Truck Suction Hose, the unit is reinforced with two layers of rubber-coated braided rayon cord, plus a helix of high-tensile spring steel wire.

As a result of this construction, the hose is claimed to be light in weight, resistant to kinking and collapse, and capable of being grounded to dissipate static electricity. This hose is available in 1¼- to three-inch inside diameter sizes.

Goodrich's New Heavy-Duty Highway Express Tire

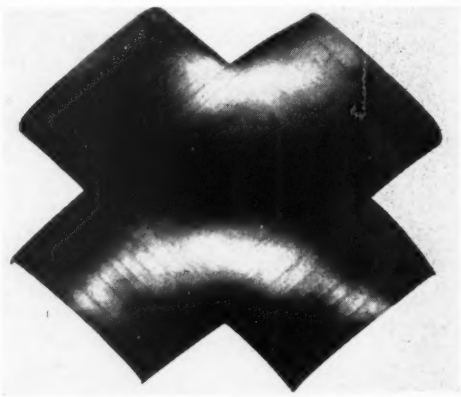
Heavy-Duty Truck Tire

THE B. F. Goodrich Co., Akron, O., has announced a new Heavy-Duty Highway Express tire, with a Wonder Tread, that is said to have cut tire costs as much as 35% in actual tests on truck fleets. The new tire features molded treads of a flat, wide contour to provide shoulder to shoulder contact of the tire with the pavement. As a result of this and other new construction details, cooler running, increased mileage, improved traction, and resistance to skidding are claimed for this new tire, which is available in sizes ranging from 6.50-20 6-ply to 11.00-22 14-ply.

Flexmaster Tire Repair Material

A NEW truck and passenger-car tire repair unit, the Flexmaster, has been introduced by W. J. Voit Rubber Corp., Los Angeles, Calif. Composed of natural rubber, high-grade cushion stock and reinforced with extra-high-tensile rayon cord, the repair section is claimed to assure a safe and lasting bond while supplying maximum strength with minimum weight.

Physically, the Flexmaster has been engineered to an 82-degree angle which conforms more closely with all new car and truck tire construction. Also, the top ply has been strengthened through longer ply length, but the convenient longer tie-in feature has not been extended into the bead area.



Flexmaster Tire Repair Section

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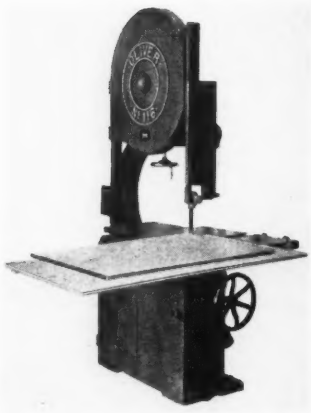
Sponge Rubber Cutter



Oliver No. 116-D Sponge Rubber Saw

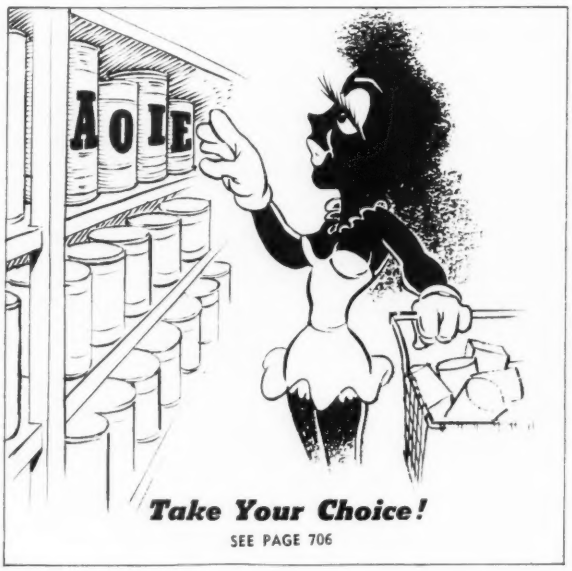
A MODIFICATION of the Oliver No. 116 band sawing machine, specially designed for cutting sponge rubber, has been announced by Oliver Machine Co., Grand Rapids, Mich. Model No. 116 contains two 36-inch wheels around which the saw travels, and a 36-inch square table which tilts 45 degrees to the right and five degrees to the left. Other specifications for this unit include: 35½ inches between saw and column; speed of saw, up to 1,200 rpm.; and maximum height of cut under guide, 22 inches.

The modified machine, No. 116-D, has the same specifications as the basic unit. In addition, it contains a special blade, guide unit, and sliding plywood table for the sponge rubber operation. The table is three by five feet in area and runs on ball-bearing rollers, guided by a T-strip in the machine table. This unit is claimed to be capable of cutting sponge rubber clean, fast, and within $\frac{1}{32}$-inch of outside edges. The standard maximum thickness of cut is given as seven inches.

Hot Stretch Processing of Nylon Cord

A NEW method for hot stretching nylon tire cord prior to calendering has been developed by Aetna-Standard Engineering Co., Pittsburgh, Pa. The equipment used in the process consists essentially of electrically driven pull roll stands at each end of a heating and cooling oven. The temperature of the nylon cord in the oven is accurately controlled at all times, including during speed changes and shutdowns.

Predipped and dried nylon fabric from any existing predip machine is passed through the stretching unit and then either delivered to wind-up equipment or passed in tandem through coating calenders. The principal features of the unit include an adjustable speed arrangement which automatically synchronizes it to the speed of the predip machine; controlled and recorded elongation; measured and recorded fabric tension; and a me-



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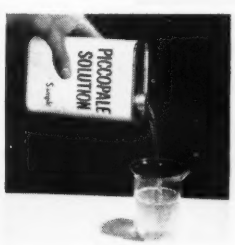

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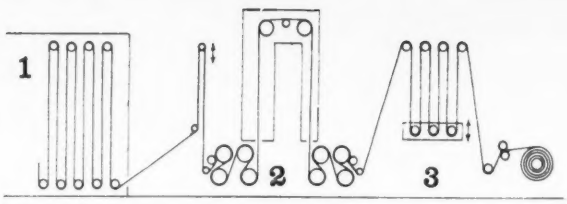


Possible Arrangement for Aetna-Standard Hot Stretch Unit

(1) Oven of Existing Predip Machine; (2) Hot Stretch Unit; (3) Relocated Accumulator and Wind-up for Predip Machine

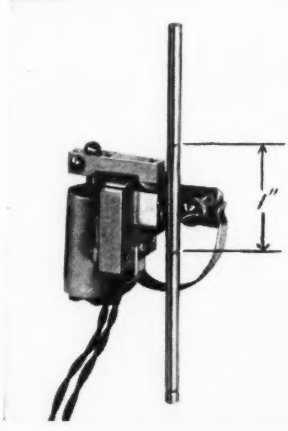
chanical threading device for passing the fabric through the equipment.

The Aetna-Standard unit is designed for continuous processing of the cord at speeds up to 60 yards a minute in widths up to 62 inches. The recommended capacity for the unit is up to 10 pounds' tension per cord. Laboratory tests on predipped cord of size 210/4/2, processed at 10 pounds per cord, are said to have resulted in a net elongation of 20%. In testing this stretched cord to its breaking point, a reported elongation of only 5½% was recorded with no degradation of the dip coating apparent under microscopic examination.

Splices will not hold the fabric at this tension; consequently, the tension must be relaxed during passage of the splice. Since the fabric length in the unit is approximately six yards, it is practical to discard this released length after processing. It has also been found that the use of knots to splice individual cords limits the tension which can be used at high cord temperatures to about seven pounds.

Electric Extensometer

A NEW high magnification electric extensometer, Type S-9, for detecting strain under both elastic and plastic tension tests of specimens 1/10- or ½-inch in gage length and 1/16- to ⅜-inch in diameter is available from Tinius Olsen Testing Machine Co., Willow Grove, Pa. Used with the Olsen Model 51 electronic recorder, the extensometer is a lightweight instrument which provides magnifications of 50, 100, and 200.



Olsen Type S-9 Electric Extensometer

In operation, the activating knife edge on the instrument moves as the specimen stretches. This action causes movement in the core of an Atcotran differential transformer, creating an AC voltage amplified to rotate the recorder drum in direct proportion to the strain on the specimen. Calibration is based upon linear distances of the activating knife-edge lever, which corresponds to the linear distances of the recorder.

Radiation Gage Accessories

A NEW mounting for its AccuRay radiation gages has been announced by Industrial Nucleonics Corp., Columbus, O. The gage itself utilizes radiation to give a direct reading of weight or thickness in order to measure and control continuous sheet production. The mounting reportedly permits a standardization of measuring systems throughout the complete line of AccuRay products and features a low, compact measuring head which simplifies installation on production lines and provides easy access for servicing. The tapered bracket is available in throat depths up to 160 inches.

The company also announced the development of a new variable-speed scanning mechanism specially designed for industries where sheet profile is important. The unit enables the gage to move

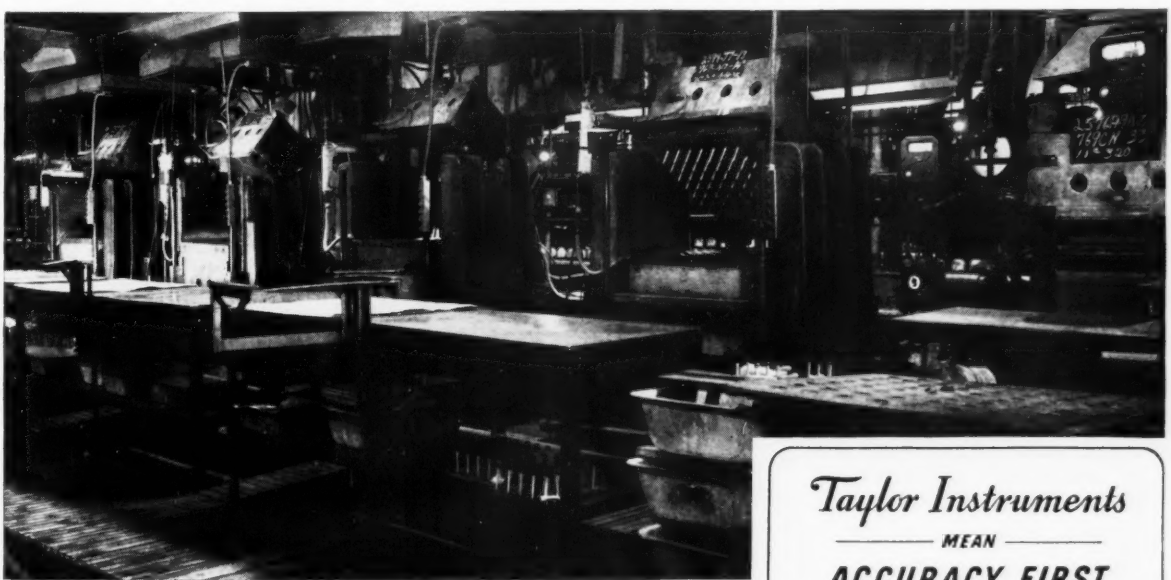
How to hustle a bustle!

The Schrader Valves that keep the air in your tires had their start in Milady's bustle. August Schrader, she quickly discovered, had created a valve that would never betray her by a hiss or collapse in a social gathering. Today, Schrader Valves are being turned out by the million for automobile and truck tires, and such diverse uses as pneumatic life rafts, diving equipment and airplane shock struts. In fact we use them in great quantities in the new Taylor plug-in TRANSET* system.

Just as we rely on Schrader, so they depend upon Taylor instrumentation for the important curing and forming of the rubber and the vulcanizing of the valve stem to the base. The tilt-head presses shown below are operated by Taylor FLEX-O-TIMER* Time Cycle Controllers. Each governs seven functions of the press, starting with the application of hydraulic pressure to close the platens. Meanwhile, a FULSCOPE* Temperature Indicating Controller controls steam input to the platens, and a 2-pen Taylor Recorder logs the temperature of the condensate, and pressure on the ram. This chart gives an accurate count of the number of cycles during the day.

Thus Schrader are assured of matchless uniformity and continued high quality. Ask your Taylor Field Engineer how *you* can save money and protect *your* product quality. Or write Taylor Instrument Companies, Rochester, N. Y. and Toronto, Canada. *Instruments for indicating, recording and controlling temperature, pressure, flow, liquid level, speed, density, load and humidity.*

* Reg. U. S. Pat. Off.



Picture shows Schrader's platen presses, in which dozens of valves are made in one cycle. Their whole sequence of operation is automatically timed and controlled by Taylor instrumentation.

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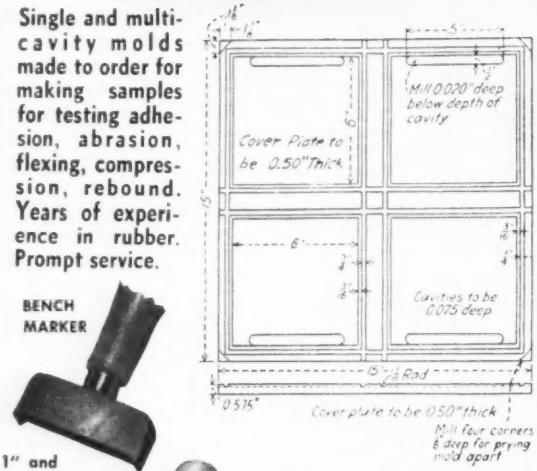
Cover Plate to be 0.50" Thick
Mill 0.020" deep below depth of cavity
Cavities to be 0.075 deep
15 1/2 Rad
0.515"
Cover plate to be 0.50" thick
Mill four corners 1/8 deep for prying mold apart

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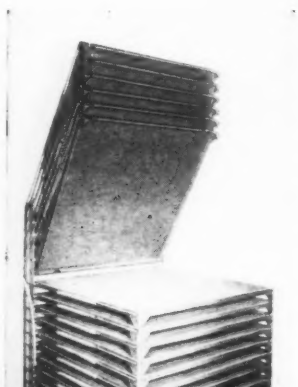
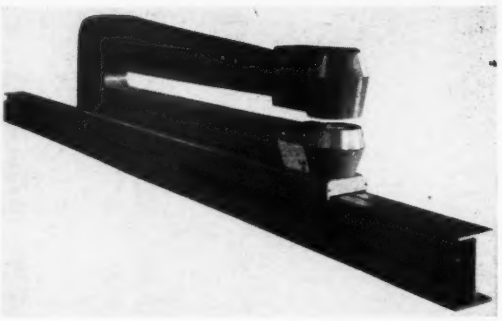


This new Truck gives unobstructed access to three sides of each tray and offers a convenient method for storing materials that require cooling or air drying. The one piece construction Trays are spring supported and can be quickly raised or lowered, free from all locking devices. Trucks having 18 perforated trays 36" x 36" or plain surface trays 36" deep by 4 ft., 6 ft. and 8 ft. long, can be furnished either stationary or mounted on casters.

SPADONE MACHINE COMPANY, INC.
10 East 43rd St. New York 17, N. Y.



Mounting for AccuRay Radiation Gages

slowly across the sheet while scanning and recording the continuous profile picture. The gage then retracts quickly to repeat the scanning cycle while the recorder pen remains stationary.

Blue Electric's Laboratory Oven

Laboratory Gravity Oven

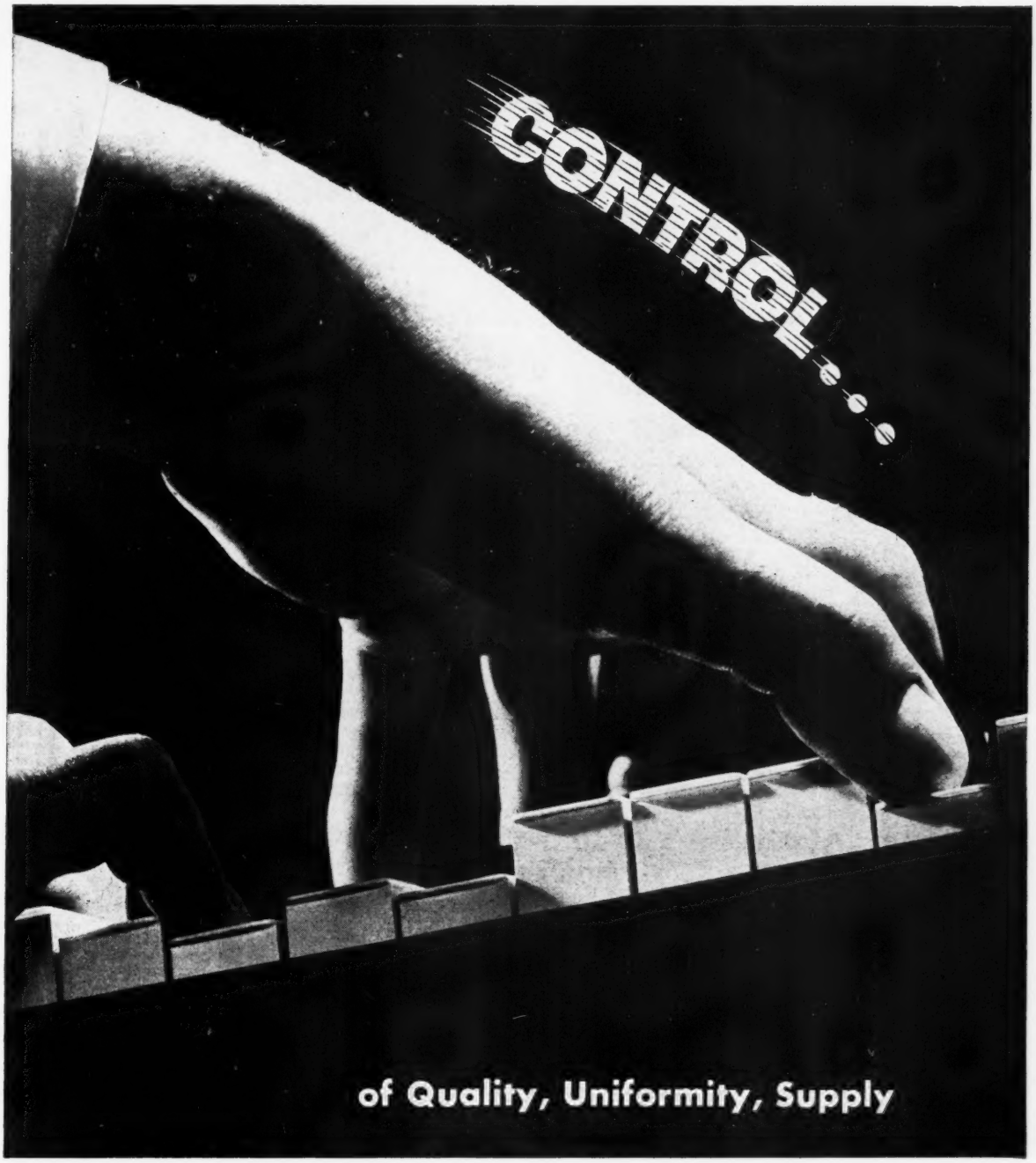
THE Blue M Electric Co., Chicago, Ill., has developed an electric utility laboratory gravity oven for analytical and general laboratory work involving baking, drying, aging, etc. Available in three standard sizes of volumes 512, 1728, and 5130 cubic inches, respectively, the ovens are double-wall constructed of stainless steel to withstand operating temperatures of 100-550° ± ½° F. Fiberglas insulation, power selector switch, double-banked heating mechanism, and recessed slanted base on which control components are mounted are among the features of the unit.

Ultracentrifuge Cell

THE Spinco Synthetic-Boundary Ultracentrifuge Cell, product of Specialized Instruments Corp., Belmont, Calif., is a device which permits measurement of the sedimentation constant of a slow-settling component in the presence of a fast-settling component. The manufacturer claims that this product effectively extends the range of ultracentrifugal analysis downward in the macromolecular region from molecular weights of about 10,000 (the former practical lower limit) to about 500.

The operation of the unit depends on the formation of a boundary by centrifugal force between a solution containing the

(Continued on page 829)



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New Materials

New Chemigum Rubbers

TWO new nitrile rubbers, Chemigums N6 and N7, have been announced by the chemical division of The Goodyear Tire & Rubber Co., Akron 16, O. The new rubbers are the same basic polymers as their respective forerunners, Chemigums 30 N4NS and 50 N4NS, but have an almost white color resulting from changes in postpolymerization processes. The new Chemigums are expected to find wide application in the compounding of light-colored oil resistant stocks. The rubbers will be available in 50-pound bales that will require less storage space and provide greater ease in handling than the previous 90-pound bales.

Reclaim in Powdered Form—Flo-Mix 66

A NEW form of reclaimed rubber which reportedly pours like sugar and costs approximately 10¢ less per pound than conventional forms of reclaimed rubber has been developed by U. S. Rubber Reclaiming Co., Inc., Buffalo, N. Y. Known as Flo-Mix 66, the new product is in powdered form, making it much easier to handle than the conventional slab form of reclaimed rubber.

This material is a result of a new and patented method for reclaiming rubber which, according to the company, produces a product that retains more of the original quality of the rubber than can be retained by conventional processes. This process is also claimed to be much faster, taking only 24 minutes to complete a cycle.

Flo-Mix 66 is recommended by the company for use in the tread, sidewalls, and between the fabric plies of tires; in battery boxes; molded mechanical goods; footwear; soles and heels; and industrial belting. In some of these applications it is said to have reduced the mixing time appreciably.

Fungicide for Vinyl Coated Fabric

NUODEX 100 VT, made by Nuodex Products Co., Inc., Elizabeth, N. J., is a new fungicide developed for use in vinyl coated fabric or paper employed as shoe linings where white or light colors are desired. The new material reportedly is non-irritating, non-sensitive to the skin, and stable at temperatures encountered during normal milling and curing operations.

Available in liquid form, the fungicide is incorporated in vinyl coating compositions where it is said to be compatible with all commercial resin-plasticizer-stabilizer combinations. The purpose of the material is to stop bacteria and fungi from attacking the organic plasticizers which are formulated with the coatings to make the finished product soft and pliable and, in this way, eliminate musty odors and inhibit athletes-foot fungus.

Softseam—Foam Rubber Cement

A NEW cement has been developed by Anchor Adhesives Corp., Flushing, N. Y., for use in bonding foam rubber core or slab stock to wood, fabric, leather, and leatherette. Called Softseam, the adhesive can be applied by brush or machine and will produce a seam said to be as soft as the foam itself.

Softseam is a transparent, solvent-type cement having a low viscosity. It is reportedly fast drying with quick grab properties and is claimed to lose depression tack within a few hours after application.

"Dry Coloring—Lustrex Styrene—Colorant Blend Molding Compound." Product Information Bulletin No. 85. Monsanto Chemical Co., Springfield, Mass. 32 pages. The techniques used in connection with the dry coloring of this compound, including equipment, colorants, the process itself, molding aids, coloring aids, and methods for obtaining special coloring effects, are discussed in this manual. In addition, a two-part supplement on improving color uniformity and on inventory savings for dry coloring processes is contained.

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Postwar vs. Prewar Rubber Industry

How the present state of the rubber industry in Western Germany compares with that of 1938 is discussed by S. Born,[1] who shows that the total production of the industry was only 0.7% under the prewar figure for all Germany. The number of tires made in 1952 was on a level with prewar output, though, when weight was considered, there was an overall difference of 8.5% in favor of 1938, a difference which would have been greater if tire repair material had not been included in the total for tires. Other rubber manufactures showed many postwar decreases, as compared with 1938, which however were overbalanced by substantial gains in footwear, heels and soles, surgical goods and sundries (largely due to the growing popularity of the sponge and foam rubber products), and smaller increases in some other lines, so that in the end the 1952 totals for other rubber manufactures showed an advance of 7.8% over prewar figures.

The following table (in metric tons) compares 1952 production with that of 1951 and 1938.

	All Germany	West Germany	
	1938	1951	1952
Tires			
Cycle tires	18,804	12,513	10,988
Passenger-car (including motorcycle)	35,125	32,256	33,915
Truck and special	69,195	54,476	60,851
Tire repair material	5,135	10,010	11,535
TOTAL	128,259	109,255	117,289
Other Rubber Goods			
Heels and soles	13,560	24,875	33,335
Footwear	8,000	11,717	11,943
Conveyor belts	6,470	6,924	7,045
Lined hose	10,550	7,837	8,026
Other mechanical soft rubber goods	32,187	35,325	35,279
Surgical goods and rubber sundries	5,909	4,641	6,080
Rubberized fabrics and goods thereof	11,116	4,368	4,395
Other soft rubber goods	20,050	15,230	15,633
Hard rubber goods	10,689	6,095	6,065
TOTAL	118,531	117,012	127,801

The postwar decline in production of rubberized fabrics and also of hard rubber goods, shown in the table, clearly illustrates the inroads that plastics have made in these lines.

Consumption of rubber and reclaim for the three years under review is shown below (in tons):

	All Germany	West Germany	
	1938	1951	1952
Natural rubber	91,297	83,089	88,641
Synthetic rubber	4,677	4,426	9,236
Reclaim and old rubber	36,981	27,500	27,783
TOTAL	132,955	115,015	125,660

The increase in the use of synthetic rubber in 1952, as compared with 1938 and 1951, is worth noting. The larger consumption of reclaim in 1938 was, of course, primarily due to the insistence of the government on economy in the use of natural rubber.

[1] *Kautschuk u. Gummi*, 6, 4, 72 (1953).

Tire Output Declining

Motor vehicle production in Western Germany made remarkable strides in the four-year period 1949-1952; output of motor cycles, passenger cars, and tractors trebled, and that of trucks doubled in this time. Tire production kept pace, to reach a peak in 1952. However, as the most urgent needs had apparently been satisfied, demand for motor vehicles began to taper off in the last months of 1952 and early months of 1953; the decline was more than seasonal. This trend found a parallel in sagging sales and production of tires, which became particularly marked in the early months of 1953.

With demand for tires for original equipment off, and export business reportedly slack, tire manufacturers are concerned over 1953 prospects and the possibility of maintaining the 1952 level of production and business, although the recollection that the first half last year was also rather dull, before the strong upswing set in, holds out hope of a similar recovery later on in the current year.

The following table (in units) shows the progress of the motor tire industry from 1946-1952:

Tires	1946	1947	1948	1949
Motor cycle	48,089	72,561	173,016	625,026
Passenger car	447,990	486,172	1,079,012	2,212,565
Commercial vehicle	369,381	437,836	776,794	828,642
Total	865,460	996,569	2,028,822	3,666,233

Tires	1950	1951	1952
Motor cycle	886,116	913,593	1,192,298
Passenger car	2,335,246	2,966,713	2,986,210
Commercial vehicle	1,122,290	1,475,887	1,650,537
Total	4,343,652	5,356,193	5,829,045

I. G. Farben Split and Reorganized

Toward the end of March, the companies below, formerly members of the I. G. Farbenindustrie combine, and until recently under Allied control, announced their reorganization.

Badische Anilin & Soda Fabrik now has a capital of 340,000,000 DM. Including the August Victoria works at Marl-Huls, the concern employs about 35,000 workers. The chemical plant at Ludwigshafen a.Rh. alone has 27,000 persons on its payroll, making it the biggest chemical factory in Europe. B.A.S.F. owns Indanthrenhaus Hamburg, G.m.b.H., and participates in Duisburger Kupferhutte, Duisburg, Chemische Fabrik Holten, G.m.b.H., Oberhausen, and Oxo, G.m.b.H., Oberhausen-Holten. B.A.S.F. has business relations with some 90 countries and in 1952 reported a turnover of 661,100,000 DM., excluding trade of its affiliated companies.

Farbwerke Hoechst, A.G., formerly Meister Lucius & Bruning, Frankfurt (Main)-Hoechst, organized in 1865, has raised its share capital to 285,700,000 DM. and is taking over the following works from I. G. Farbenindustries, in liquidation:

Farbwerke Hoechst, Chemische Fabrik Griesheim, Naphthol-Chemie Offenbach und Lech Chemie Gersthofen; also, as affiliated companies, Knapsack-Griesheim, A.G., Knapsack bei Koeln; Kalle & Co., A.G., Wiesbaden-Biebrich; Bobingen, A.G., fur Textil-Faser, Bobingen bei Augsburg; Behringwerke, A.G., Marburg. The concern has an interest in the Dr. Alexander Wacker Gesellschaft fur Elektrochemische Industrie, G.m.b.H., Munich, and in Duisburger Kupferhutte, and includes in addition eight more affiliates and interests. In its present form the organization is said to correspond substantially to Farbwerke Hoechst as it was in 1925 when it was merged with I. G. Farbenindustrie. Hoechst and affiliated companies together have 27,000 employes, and their total turnover came to 760,000,000 DM. in 1952.

The reorganization of Farbenfabriken Bayer, A.G., has been accompanied by an increase in capital to 387,700,000 DM. The object of the firm is stated to be mainly to continue Farbenfabriken vorm. Friedr. Bayer & Co. (founded in 1863) and Chemische Fabriken vorm. Weiler-ter-Meer, Uerdingen, Rh. (founded in 1861), and the new firm will comprise the plants at Leverkusen, Elberfeld, Dormagen, and Uerdingen, besides various other interests.

Finally, Dr. Alexander Wacker Gesellschaft fur Elektrotechnische Industrie, G.m.b.H., has been renamed Wacker Chemie, G.m.b.H., Munich.

Dechema Activities

A European Conference of Chemical Engineering, sponsored by the Dechema, Deutsche Gesellschaft fur Chemisches Apparatewesen, and the Societe de Chimie Industrielle, was held in Paris, beginning June 22, in connection with the II Salon de la Chimies and the XXVI Congres International de Chimie Industrielle, the Dechema announced recently. Scientists from five European countries and from the United States will present papers.

The Dechema building at Frankfurt a.M. is to house a new information center for the chemical apparatus and equipment industries, said to be the first of its kind not only in Germany, but in the whole world. The Dechema-Institut fur Apparate- und Stoffkunde (Dechema Institute for Chemical Apparatus & Chemistry), as the new center is to be called, proposes to collect and display, as far as is practicable, all forms of chemical apparatus and equipment and materials used in their construction, also metering and control devices and new raw materials for the industry. These will be classified according to design, mode of operation, principles, and possibilities of utilization, thereby filling a long-felt need.

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Hannover Technical Exhibition

At the Technical Exhibition in Hannover, April 26-May 5, more than half the large number of entrants in the chemical section were producers of plastics or of materials for the plastics industry and included many leading chemical concerns.

Huls Chemical Works showed a wide range of specialties; among others the new oil-extended rubber, Buna OP; high styrene content mixed polymers of butadiene and styrene, known as Duranit 10 and 30; PVC pastes, including one incorporating a blowing agent, for making porous molded bodies; Gepolit (mixed polymer of vinylchloride and styrene), especially useful for floor coverings; dispersions of a mixed polymerizate of butadiene and high styrene (Lipolit); and PVC dispersions.

Anorgana, G.m.b.H., featured different types of plasticized and unplasticized PVC sheeting for a variety of purposes; among others a type designed for making venetian blinds; also a wide assortment of silicon products, as silicone emulsions, resins, and rubbers.

Farbenfabriken Bayer displayed new Moltoprene foam products, as elastic Moltoprene with multicolored effects produced by screen-printing, and Moltoprene bonded to metal by means of an intermediate coat of Leguval (polyester).

New vinylchloride-vinylacetate-maleic acid resins (Hostalit CAM) for heat-sealable lacquers for sheet material and paper; molded parts of Hostaflon dispersions (polytrifluorochloroethylene) and asbestos fibers; and many applications of polyvinylacetate, were shown by Farbwerke Hoechst, A.G.

Casell-Farbwerke-Mainkur, A.G., exhibited polyacrylonitrile fiber PAN in a wide variety of types and applications.

Badische Anilin & Soda Fabrik featured casting resins and a new impact-resistant polystyrene, EB; also an improved polyamide plastic, Ultramid S, claimed to have properties superior to the company's Ultramid A.

The numerous uses of a new compression molding material, Bascodur, developed especially by B.A.S.F. for chemical apparatus, were demonstrated at the stand of Dr. F. Raschig, G.m.b.H.

Recent Plastic Developments

While much has been accomplished in recent years to improve the quality of the surface of goods made from soft P.V.C., there are still some weak spots, as the tendency to absorb certain dyes and colors present in a number of articles of daily use, among others, lipstick, nail polish, and printer's ink; and also the tendency particularly noticeable in P.V.C. upholstery materials, for surfaces to feel cold in winter and moist and sticky in summer. To solve these and other surface deficiencies, Gerhard Beck[1] proposes a new method of finishing. The soft P.V.C. base is surfaced with an intermediate coat of P.V.C. mixed with polyurethane in the form of the monomeric diisocyanate and polyester components, which, after gelatination, yields a film adhering well to the base. At this stage the polyurethane adducts embedded in this film have not reached the final addition stage so that reactive isocyanate groups still "protrude," as it were, and can react with the NH groups of polyurethane or polyamide solutions applied as final top coats. Principal valence bonds are thus formed so that the finishing layer is chemically anchored to the P.V.C. base through the intermediate layer.

Among recent new developments may be noted polystyrene foundations for honey combs, now being produced to make up for the shortage of bees wax in the Federal Republic. The foundations, made from pale yellow polystyrene by the injection molding process, are claimed to have several advantages over those made from bees wax, which frequently also contains paraffine and stearine. The foundations are completely odorless and tasteless, sterile to contagious diseases, easily cleaned in hot water, and reusable. The initial cost is rather high, but their long life (they are said to last almost indefinitely) and the other advantages mentioned more than make up for this.

According to official statistics, the 1952 output of plastics in the Federal Republic included 27,576 metric tons of plastics from cellulose derivatives; 2,967 tons of celluloid; 81,203 tons of condensation products (not converted to molding materials); 17,365 tons phenol molding materials; and 82,243 tons of polymerization products. In the first 11 months of the year, 9,895.2 metric tons of plastics materials were imported; while 21,636.4 tons were exported. At the same time 70.7 tons of manufactures from plastics were imported, against 1,927.1 tons exported. Total foreign business for the first 11 months of 1952 thus included 9,965.9 tons of imports, and 23,563.5 tons of exports, which were valued at 41,693,000 D. marks and 137,009,000 D. marks, respectively.

[1] *Kunststoffe*, 43, 3, 107 (1953).

Synthetic Rubber Notes

At a press conference on March 19, in connection with the automobile show at Frankfurt a.M., Otto A. Friedrich, general manager of the Phoenix concern, expressed himself in favor of collaboration on synthetic rubber production among Germany, France, and Italy.[1] These last two countries, he intimated, were already seriously considering the matter, and he asked why the step toward a division of the work on synthetic rubber among the three countries concerned should not be taken immediately.

Friedrich pointed out that today synthetic rubber accounted for a third of world rubber consumption and was bound to make further headway as the quality was improved and the cost reduced, especially if the uncertain political condition in the rubber planting countries in the Far East continued.

After the war's end, he went on, Germany—the pioneer in rubber synthesis—had had to stop production; while America shot ahead. Now the question was whether by utilizing recent American experiences, Germany would be able to produce synthetic rubber economically in competition with both American synthetic rubber and natural rubber.

Some of the technical points of synthetic rubber production were discussed by W. Klein in a paper comparing the status of rubber synthesis in the United States and in Germany, delivered before a meeting of the Nordrhein-Westfalen branch of the Deutsche Kautschuk Gesellschaft, in Dusseldorf, February 6. He showed how the close cooperation between American rubber manufacturers and the synthetic rubber producers led to a compromise between quality and processability; whereas in Germany, where the same degree of cooperation did not exist, up to now quality had been the first consideration. The results of this divergence in policy are illustrated by the fact that though mixes of Buna S3 show a ten-point superiority in elasticity tests over corresponding GR-S mixes, the German product must undergo preliminary thermal treatment to bring it to the desired degree of softness before processing can begin. The elasticity of LTP GR-S is greater than that of standard GR-S, but is still four points below that of Buna S3, but the cold rubber is more easily processed.

Klein considers Buna S3 latex especially suitable for preparing American-type oil-extended rubber (the process, he claims, is an American modification of a German wartime economy measure requiring synthetic rubbers to be extended by incorporation of Naftolen ZD during compounding). At Huls, he adds, Buna OP (oil-extended rubber consisting of 100 parts Buna S3 and 50 parts Naftolen ZD) has been experimentally produced and is said to show good processing qualities; it can be heavily loaded with carbon black.

With regard to Nitrazol and Alfin rubbers, he says of the former that the method is based on patents taken out in 1942 and 1943 by I. G. Farben; as to the latter, no large-scale polymerization with well-defined metal-organic compounds has been carried out in Germany. He concludes that only two of the American processes reviewed would be practicable for Germany—cold rubber and oil-extended rubber.

[1] For other views, see our May, 1953, issue, p. 264.

Rubber Society Meets

The Deutsche Kautschuk Gesellschaft (German Rubber Society) held its annual general meeting, followed by a three-day conference, at Goslar, May 7-9. The program included the following papers:

"Investigations on Oil-Plasticized Buna S 3," O. Enslin, Frankfurt a.M.; "Processing Neoprene—Known Facts and New Developments," R. Ottenhoff and R. E. de Puy, Wilmington, Del., U.S.A.; "Photo-Elastic Studies of Fatigue Phenomena in Rubber Articles," A. Amgioletti, Milan, Italy; "Oxidation of Rubber and Its Vulcanizates," P. Schneider, Leverkusen; "Properties of Plastic Foams, with Special Reference to High Elastic Polyurethane (Moltoprene) Foams," E. Weinbrenner, Leverkusen; "Rheological Studies of Filled and Unfilled Rubber Latex," S. W. Broese, Bad Hersfeld; "Filler Reinforcement in the Light of Thixotropy," R. Houwink, Delft, Holland; "Dispersion of Fillers in Rubber" and "Dynamic E-Modulus and Damping in the Elastic Range," R. Ecker, Leverkusen; "Structure and Fineness of Natural Fillers Containing Silicic Acid, Compared with Kaolins and Chalks," A. Meyer, Neuberg, Donau; "Titrimetric Investigations on Fillers," R. Meyer, Hamburg; "Effect of Fillers on the Gas Permeability of Rubber," H. J. v. Amerongen, Delft; "Some Examples of the Microscopical Investigations of Tear Processes," I. Kruse, Hamburg; "The Tire in Agriculture," H. Meyer, Braunschweig; "Heating and Destruction of Vulcanizates under Dynamic Strains," P. Kainradl, Vienna, Austria; "Abrasion of Automotive Tires," W. Kern, Munich; "Investigations of Electrostatic Charges in Automotive Tires," H. Stein,

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Fulda; "Cellulose Rayon for the Tire Industry," E. Pieper, Wuppertal; "Development and Use of Perlon for Tires and Other Rubber Goods," K. Jehle, Bobingen; "Some Recent Concepts in the Colloid Chemistry of Carbon Black and its Reinforcement of Rubber," M. Studebaker, Akron, O., U.S.A.; "Electrical Measurements on Rubber Carbon Blac: Systems," G. Kickstein, Munich; "The Mooney Viscometer," T. Baader, Isernhagen (Hannover); "Comparative Measurements with Plastometers," H. Bannasch, Leverkusen; "Dispersion Structures in Active Carbon Vulcanizates," J. Kruse, Hamburg-Harburg; "Conductiometric Titration of Accelerators and Anti-Agers," W. Scheele, Hannover; "Latex Testing Methods," W. v. d. Tempel, Delft; "Mechanical Therm.l Processes in the Deformation of Plastic Rubber Compounds (in Milling, etc.)," S. Kiesskalt, Aachen; "Calender Problems," H. Frohlich, Hannover; and "Pneumatic Measuring and Controlling Devices," R. Wannow, Munich.

Rubber Trade Notes

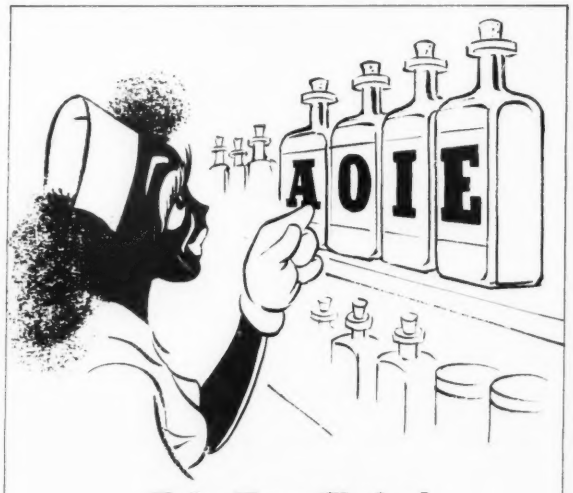
More than a year ago a price equalization fund was established which permitted Buna to be supplied to consumers in West Germany at 2.10 DM. per kilo, although the actual price was 4.60 marks per kilo. It is now learned that Huls Chemical Works has been able to reduce the price of Buna S to 4.35 DM. per kilo; but the price to consumers has been raised to 2.25 DM. per kilo. The adjusted price for the oil-extended rubber Buna OP has been fixed at 1.70 DM. per kilogram.

Interest in foamed latex has increased enormously in Germany, as a visit to the Frankfurt Spring Fair of 1953 revealed. German manufacturers are now producing foam rubber mattresses, cushions, upholstery materials (also for automobiles), pads for rugs, shoe linings, inserts for dress shields, bandages, especially for use in varicose veins and edema of the legs. Foam rubber is also cemented to the backs of carpeting materials in a new type of flooring and to the backs of fabrics for outer garments.

The German section of the Rubber Stichting, Delft, Netherlands, is arranging an international conference on the application of rubber in railway construction, to take place early in September, in connection with the Transport & Communications Exhibition to be held in Munich. Experts of the Federation Railway Systems and of Societe Michelin are to speak on the latest developments in railway technique.

RUSSIA

Russian attempts to cultivate *Kok-saghyz*—a dandelion type of weed which grows wild in Kazakstan—as a domestic source of natural rubber have had to be abandoned, a report from Helsinki reveals. The rubber in *Kok-saghyz* is chiefly concentrated in the roots, and the process of extraction is not only very difficult, but costly. Moreover, when the weed is trans-



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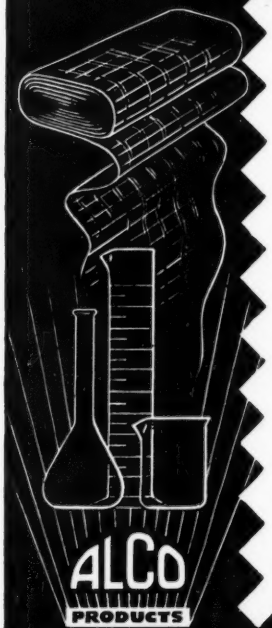

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planted to other parts of the Soviet Union, it spreads to such an extent as to threaten other crops, and since measures to contain this growth have failed, there was apparently nothing left but to abandon the project.

It is added that efforts are being made to increase production of synthetic rubber by 82% under the current five-year plan; however, production costs appear high.

FAR EAST

MALAYA

Stimulants to Increase Yields of Trees

It is now known that it is possible to increase yields of rubber trees by treating the bark below the tapping cut with stimulants containing a hormone, or by injecting copper sulfate into holes bored in the trees at the level of the tapping cut.

The *Planters' Bulletin*[1] publishes results of tests with such yield stimulants on seedling trees. Work of this nature is also in progress on different clones, but no information can yet be given out.

Although injection with copper sulfate has given satisfactory increases, the method is not recommended for use in general practice for the following reasons: (1) Damage to bark and wood cannot be avoided even with the greatest care. (2) Boring holes into the trees is costly and laborious unless carried out by mechanically operated means. (3) Accidental contamination of the latex with copper may occur.

Stimulation by treatment with mixtures containing hormones (e.g., Stimulex, Eureka, the sodium salt or n-butyl ester of 2,4-dichlorophenoxy acetic acid) gives greater yield increases than by copper sulfate injection. The effect of the treatment, however, usually does not last longer than three months, after which the yield returns to normal; trees cannot be treated oftener than once in six months as more frequent applications may cause yields to decrease after a time. Hormone stimulants also cause an increase in the thickness of the bark at the cut, which may lead to shallow tapping and hence loss of crop.

Experience so far leads to the advice that copper sulfate should not be used and that other stimulants be used with caution, since long-term results are not yet available.

[1] July, 1953, p. 89.

Production of Rubber Declines

Malaya's output of natural rubber in the first half of 1953 was about 4,500 tons less than in the corresponding period of 1952; the difference was due to a 10% decrease in smallholder production which the increase in estate output could not completely offset.

The comparative figures—in round numbers—were 163,000 tons from estate and 111,500 tons from smallholdings for the 1953 period, and 157,000 tons from estates plus 122,000 tons from smallholdings in the first half of 1952.

Latest statistics put the total area of tappable rubber in Malaya at 1,735,977 acres. The total area of high-yielding material being tapped comes to about 412,000 acres, or almost 25% of the whole. About 330,000 acres are on European estates, 72,000 acres on Chinese, and 10,000 acres on Indian lands. That is, Asian growers account for about ⅕ of the tapped acreage under high-yielding trees.

Joint Industrial Councils

Proposals to form a joint industrial council for the rubber plantation industry here are being considered. The council would consist of representatives of the M.P.I.E.A. for the owners and of the All-Malayan Estate Staff Union and the Pan-Malayan Rubber Workers' Union for the employes. The aim is to establish a national council to act in both a consultative and a negotiating capacity. Among the objects would be to: (1) maintain uniform hours and conditions throughout the industry; (2) consider existing methods of settling differences and to establish permanent machinery for this purpose where it does not already exist; (3) represent the needs and opinions of the industry to government; (4) consider, report, advise, and make representations on any proposed legislation affecting the industry; (5) assist in maintaining selling prices which will afford reasonable remuneration to employers and employes both; (6) establish means of insuring workers the greatest possible security of earnings and employment without restriction on change of employer and to try to reduce unemployment.

Financial Aid Sought

The boom period in southeast Asia brought on by the Korean war was just long enough to lift prices of various commodities to almost abnormal heights, raise the cost of living and wages, and generally to sow the seeds for increased social unrest. The last year or so, after the boom began to peter out, has seen a spread of economic tension in this area.

Malaya on the whole managed well enough until the beginning of the current year, when prices for her chief products, rubber and tin, dropped more steeply than they had done for a long time. Now the stage has been reached where it has been found necessary to apply to Western countries for aid, and the deputy High Commissioner for Malaya, Sir Donald MacGillivray, recently went to London on this mission.

INDONESIA

To Combat Leaf Disease

Not so long ago the rubber industry in the Far East felt that it was at such a distance from Latin America that it need not be unduly concerned about the introduction here of the devastating South American leaf blight. But the threat has been brought much nearer not only by increased air travel, but also by the fact that all the planting material, buddings as well as seedlings raised from Far Eastern seed (sent to Ford in Brazil in 1926 from the Far East, and to Goodyear in Panama and Costa Rica in 1935 from the Philippines) has proved more or less susceptible to the disease, and finally by the discovery that the spores of the fungus causing the leaf fall retain their germinative power for a week or more under normal tropical conditions.

As reported in India RUBBER WORLD,[1] the Rubber Research Institute of Malaya has already undertaken certain steps to meet the situation. In Indonesia rather less has hitherto been done in this direction, but it is to be expected that planters and scientists will be stirred to more vigorous action by the discussion of this menace.[2] Th. G. E. Hoedt, former director of the West Java Experiment Station, Bogor, after comparing *Hevea* selection in southeast Asia (where the accent has been chiefly on increasing yields) with that in South America (where disease-resistance is the first concern) and stressing the need of greatly increased research of the latter type in Asia, outlines his scheme for combating South American leaf disease.

In the beginning of 1952, Hoedt together with W. E. Klippert and Bert O. Vinond, respectively, assistant manager of Goodyear Plantations of Tropical America, and head manager of Firestone Plantations in Liberia, visited the rubber centers in Brazil, where there was ample opportunity of learning both about the ravages of *Dothidella Ulei* (the leaf disease fungus) and the selection work initiated to fight it. Hoedt observed that while the Far East is far ahead of South America as regards selection and seed breeding, research there has necessarily been on a narrow basis because of the paucity of material—genetically speaking—available for investigations.

What he saw of the varieties of *Hevea*, the scope, possibilities, and also the defects of the work undertaken in the Americas, suggested wide new fields of research in *Hevea* selection aiming at once at safeguarding the *Hevea* planting industry throughout the world, increasing yields, and also at developing specialized types of rubber to meet specific needs of manufacturers.

With a view to accomplishing these aims—but chiefly the first two—he outlines a scheme that goes beyond the measures proposed by Malaya. His plan envisages an international organization including all countries where *Hevea* is grown, hence also Africa and the Phillippines besides southeast Asia and the Americas,

[1] Apr., 1953, p. 114.
[2] *Arch. Rubbercultuur*, Mar., 1953.

which would have as its purpose the complete coordination of all research on *Hevea* selection. A central committee of experts, appointed by representatives of the various governments involved, would draw up a working program, and research projects would be assigned to the countries in accordance with their suitability for carrying them out. The respective governments would each appoint a scientific institution to be responsible for the quality of the work.

There would have to be guarantees of free, but supervised, exchange of planting material among the members of the organization, exchange of data and results of the research work, and mutual assistance among the scientific institutions of the rubber growing industry. The whole would be financed out of a fund formed by contributions from the participating countries. It is suggested that a provisional international committee within the framework of the Food & Agriculture Organization of the UN could undertake the preliminaries almost at once. Existing organizations in Latin America and in the Far East could very well form the basis of the new international organization, it is added.

Rubber Trade Notes

Deli Batavia Co. and Deli Batavia Rubber Co. are to merge with Deli Co., it has been announced. All three concerns have estates in East Coast of Sumatra; the first and last are tobacco producers. Deli Co. will change its name to United Deli Co.

Reports on conditions in Indonesia continue for the most part depressing. The situation in East Coast of Sumatra is said to be satisfactory, but in Western Java it continues to deteriorate, and in Eastern Java, hitherto relatively law-abiding and peaceful, it is taking on less favorable aspects. Not so long ago a series of robberies occurred on a number of East Java estates within a relatively short time.

Latex stealing, too, is on the increase again after a lull in the first half of 1952, which apparently was caused by the drop in rubber prices whereby illegal latex became a less attractive proposition. At all events, it is stated[1] that some quarters hold this fact largely the reason for the 34% increase in the output of estate rubber during the first half of 1952 as compared with the corresponding period of 1951.

Besides lawlessness in its different forms, there are difficulties caused by the tendency of labor unions to demand increases in pay for the workers whenever they feel like doing so. The rubber growers cannot pass increased costs on to consumers; therefore to yield to the unions would end by making planting unprofitable. *Bergcultures*[2] editorializes that, if granted, the wage scale (then proposed) would raise the average cost of labor in Java about 125% per worker; that the total cost of labor for the estates belonging to the three planters' organizations would be increased by not much less than one billion rupiahs. Finally it stressed that the total area of rubber estates today is only 79% of the 1938 area, while the yield per tappable hectare in Java is 10% below normal; at the same time the number of estate laborers is on an average almost 40% over what is considered the normal standard.

[1] *Bergcultures*, May 1, 1953, p. 181.
[2] May 1, 1953, p. 170.

CHINA

The Ministry of Light Industry in Communist China has undertaken an extensive program of building and expanding factories in general, it is learned from the official press. With regard to tire factories, plans call for a new mass-production plant and the extension of two existing factories to twice their present capacity. The combined output of these enterprises is expected eventually to cover all but a small part of Communist China's requirements in tires.

The official New China News Agency gives the added fact that synthetic rubber tires are being tested on Peking buses.

SOUTH AFRICA

The South African Finance Minister recently announced an increase amounting to 3d per pound in the excise duty on new and retreaded automobile tires. Supplies held by factories as well as by wholesalers will be affected, but not those in the hands of retailers. The import duty is to be increased also.

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Editor's Book Table

BOOK REVIEWS

"History of the Rubber Industry." Edited by P. Schidrowitz and T. R. Dawson. Compiled under the auspices of the Institution of the Rubber Industry. W. Heffer & Sons, Ltd., Cambridge, England. Cloth, 6 by 9 inches, 406 pages. 30s net.

This book is a genuine history, not a technical treatise. It was compiled under the auspices of the Institution of the Rubber Industry, and its impression on the reader is the masterly way in which the 35 authors, many of worldwide reputation, have shown to what extent our present scientific, technological, and commercial developments depend on the ideas and accomplishments of the past.

The 35 chapters deal with six general subjects: (1) origin of the rubber industry; (2) raw materials; (3) scientific and technical developments; (4) types of rubber products; (5) economic and social aspects of the industry, and (6) bibliographic information.

The reader will note a very great degree of impartiality and objectiveness by the authors. There is no attempt to "play up" British accomplishments, great as they are and much as they should be extolled; in fact, in some cases they seem almost to be underestimated. This point is illustrated by the statement that Goodyear distinguished himself in recognizing the possibility of vulcanization, by working under conditions of extraordinary sacrifice, and by finally solving the problem of vulcanization; whereas Hancock made no such claim, and his personal narrative shows that such a claim could have been supported. Surely, with respect to Hancock, this is a model of unsentimentality and impartiality, and by itself, it would leave the reader unaware of the accomplishments of this extraordinary man.

Of particular interest and value to many will be the bibliography of books and journals of the past and present, and a remarkable chronology of 330 important events, from B. C. to the present day; for example, seven in 1898 alone.

On the human side, one is touched by the succession of misfortunes; first that Fordyce Jones, editor-in-chief, and to whom concept of the book is due, lost by death one of his two collaborators, D. F. Twiss, an international figure; then himself had to relinquish the editorship to T. R. Dawson, who in turn died soon afterward. Fortunately the internationally renowned and beloved Dr. Schidrowitz had already taken the place of Dr. Twiss, and to him we owe completion of the book.

Finally, mention should be made of 44 illustrations, some of great rarity and technical interest.

In brief, every rubber chemist and technologist should find something of interest and value in this book, just as he likes to browse through any other book on a subject close to his heart, which contains both familiar and unfamiliar facts skillfully and entertainingly presented.

C. C. Davis.

"*Hevea:* Thirty Years of Research in the Far East." M. J. Dijkman. University of Miami Press, Coral Gables, Fla. Cloth, 9 by 11 inches, 347 pages, illustrations, tables. Price $6.

The author of this book, assistant Professor of Tropical Botany at the University of Miami since 1947, was born in Java and educated in Holland; he obtained his Ph.D. in plant physiology at the University of Utrecht. Returning to Java in 1934, he joined the West Java Experiment Station at Buitenzorg (now Bogor), where for 13 years, interrupted only by the Japanese occupation, he did research and extension work on *Hevea*, oil palm, tea, etc. By background and experience, therefore, Dr. Dijkman is well fitted for the task he undertook of presenting the essentials of the vast amount of rubber cultivation research conducted in the Far East in the 30 years preceding World War II.

Actually, as far as the Far East is concerned, he has concentrated almost entirely on the work done in Indonesia and on the whole makes only incidental reference to the extensive literature by rubber investigators in Malaya, Indo-China, and Ceylon. On the other hand, work carried out in the Far East and in the Americas up to 1950 is also discussed, including the interesting sections on "Stock/Scion Relationships and Three-Component Stock/Scion Experiments" (Chapter XV) and on the "Ancestry of the Far Eastern *Hevea Brasiliensis*" (Chapter XVII).

The material is divided into 17 chapters covering among other topics: a historical survey, soil management, planting material, tapping systems, mechanism of latex production and related phenomena, pests and diseases, modern selection methods, and

ecology and rubber improvement; this is amplified by numerous illustrations, graphs, and tables, besides references. A glossary, an illustrated description of the most important commercial clones, and tabulated data on yields and tapping methods of a large number of Far Eastern clones and selected seedling families tested in Indonesia are included in three of the five appendices.

Now at a time when rubber is "on the rebound from East to West" and western scientists and rubber growers must rely on planting material and research experiments from the Far East pending the development of high-yielding, disease-resistant clones in the Americas to quote from the foreword written by R. D. Rands, Head of the Division of Rubber Plant Investigations of the United States Plant Industry Station, Beltsville, Md., a book summarizing in English the important rubber planting research carried out by the Dutch in Indonesia is very welcome.

One regrets all the more, therefore, that it should be marred by loose statements. On the very first page of the first chapter we are told that through improved methods "the average per hectare rubber yield rose from barely 500 kgs. in 1910 to over 2,000 kgs. in 1940." The "average" yield in 1940 was by no means 2,000 kilograms per hectare (equivalent to about 1,800 pounds per acre), nor is it today; and as the data in later chapters clearly show, this point could not have been what Dr. Dijkman intended to convey.

NEW PUBLICATIONS

"The Vanderbilt News." Vol. 19, No. 3, July, 1953. R. T. Vanderbilt Co., 230 Park Ave., New York 17, N. Y. 16 pages. This issue contains a six-page feature article, complete with illustrations, on the production of foam rubber products at the plant of the Armstrong-Norwalk at Norwalk, Conn. The process involved, upon which relatively little information is available, is followed from the latex storage tanks through the final inspection and assembly, in general terms. Also contained in the publication are a description of the properties of AgeRite Spar, a non-staining antioxidant; suggestions for safe acceleration of modern camelback; and recipes of compounds for the tire repair shop.

"Review of Current Research and Directory of Member Institutions—1953." Engineering College Research Council, American Society for Engineering Education, Pennsylvania State College, State College, Pa. Paper, 330 pages, $2.50. Published biennially, this review reports on approximately 7,500 research projects at 103 institutions, the number of persons employed by the institutions, and the amount of money expended on the projects for the fiscal year 1951-1952.

"Hycar Technical Newsletter." Vol. 2, No. 8. B. F. Goodrich Chemical Co., Rose Bldg., Cleveland 15, O. 8 pages. Four compound receipes which satisfy some of the most widely used Automotive SB Specifications (ASTM D735-52T), and the recipes and properties of Hycar 4021 stock compounded with various softeners, are contained.

"Miracles of Research." Goodyear Tire & Rubber Co., Akron, O. 48 pages. Published to commemorate the tenth anniversary of the Goodyear research laboratory, this brochure describes the applications of most of the important products which have resulted from laboratory research.

Automatic Control Service. "A Proposal for Managements with Vision." CDC Control Services, Inc., Hatboro, Pa. 8 pages. This bulletin describes the functions of CDC in its field of designing, evaluating, and/or installing complete automatic control systems.

"Silastic Facts." Dow Corning Corp., Midland, Mich. The following are two-page catalog inserts which describe the properties and applications of their respective silicone rubbers: No. 9-327, Silastic 6-127; No. 9-328, Silastic 6-128; No. 9-329, Silastic 8-164; No. 9-330, Silastic 8-170; and No. 9-331, Silastic 8-181.

"Silastic Newsletter." Vol. I, No. 3, July-August, 1953. Data on resistance to high temperature aging, on hot air vulcanization, on resistance to compression set at —67 to 480° F., on steam resistance, and on qualification of the materials for various silicone rubber specifications are given for Siliastic stocks 50, 80, and 8-164.

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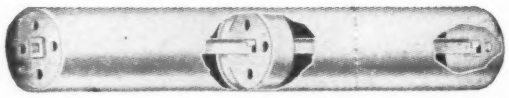

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"Chronological List of Technical Papers from the Government Synthetic Rubber Program." DRP-5. Reconstruction Finance Corp., Washington 25, D. C. 72 pages. Published technical information developed from research work sponsored by government agencies has been compiled into this listing. The period from 1942 to 1952 is covered in this edition.

"Revisions to Sales Catalogue GR-S & GR-I Synthetic Rubbers." 49 pages. Pages contained in this release are new tables E and F titled, Cold Oil-Masterbatch Polymers and Cold Oil-Black Masterbatch Polymers, respectively; revised tables A, B, H, and I; revised list of symbols; general information on code letters; revised table of contents; revised specifications on polymers GR-S-1005, -1006, -1007, -1009, -1014, -1015, -1018, -1021, -1500, -1501, -1502, -1600, -1601, and -2100, and GR-I-25; and specifications for GR-S latex polymers X-617, -619, -633, -667, -684, -695, and -710. In addition, polymers designated GR-S-1008, -1017, and -1101; X-683, -738, and -747; and GR-I-16 have been discontinued.

Revisions to "Specifications for Government Synthetic Rubbers—Revised Edition, October, 1952." 6 pages. A revised table of contents, dated July 15, 1953, and specifications for GR-S-1002 and GR-S-1018, also dated July 15, 1953, are contained.

"Cellusuede Flock." Cellusuede Products, Inc., Rockford, Ill. 12 pages. A description of the material, its methods of application, and its uses in the field of decorative finishes are discussed.

"Possibilities with Fatty Acids." M. Michel & Co., Inc., New York, N. Y. 8 pages. This booklet describes various applications of cetyl, oleyl, and stearyl alcohols, including their use as mold release agents and in cold rubber formulations.

"Marasperse for Stabilizing Oil-in-Water Emulsions." Bulletin No. 119. Marathon Corp., Rothschild, Wis. 12 pages. The characteristics of four Marasperse compounds, the preparation and properties of emulsions stabilized by these compounds, other suggested applications of the materials, and the technical mechanism of Marasperse emulsion stabilization are covered in this bulletin.

"SR-4 Strain Gages, Instruments and Accessories." Effective July, 1953. Baldwin-Lima-Hamilton Corp., Philadelphia 42, Pa. 12 pages. The price list and specifications of this class of machines are given in this bulletin.

"Working Together for Safety." National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill. 32 pages. This employe rules manual contains instructions in safe work habits applicable to most plants.

"Proportioning with Select-O-Weigh Electronic Weight Control." Bulletin 0351. Richardson Scale Co., Clifton, N. J. 6 pages. The functioning of the company's proportioning and materials handling system for automatically making up formulated mixes of bulk products by cumulative weighing on one scale is described in this booklet.

"Symposium on Conditioning and Weathering." Special Technical Publication No. 133. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. 104 pages. Price, $2.25. Ten papers and the discussions following each are given on tests for conditioning and weathering of materials.

"Measuring Equipment for Laboratory and Production Testing." GEC-1016A. General Electric Co., Schenectady, N. Y. 64 pages. More than 115 measuring and testing devices, including radiation instruments, are described and illustrated in this catalog.

"Electrical Engineering Problems in the Rubber and Plastics Industries." Proceedings Booklet S-51. American Institute of Electrical Engineers, 33 W. 39th St., New York 18, N. Y. Paper, 215 pages, $3.50. The papers presented on the subject at the third and fourth conferences of the AIEE in 1950 and 1952 are contained herein. Some topics of special interest include the role of electronics in the rubber and plastics industries; electrostatic casualties in the rubber and plastics industries; new safety code for mills and calenders in the rubber industry; control for a four-roll Z-type rubber calender train; and the application of the beta gage to calendering processes.

"Canada's First Oil Furnace Carbon Black Plant." Cabot Carbon of Canada, Ltd., Sarnia, Ont., Canada. 16 pages. This illustrated booklet, published to commemorate the opening of the new plant of Godfrey L. Cabot, Inc., Boston, Mass., describes the location and facilities of the installation and the method of black manufacture employed there.

"Kralastic Molding Compounds." Naugatuck Chemical, division of United States Rubber Co., Naugatuck, Conn. 20 pages. The types and applications of this rubber-plastic blend, the specifications and conditions required for its fabrication, and the physical, chemical, electrical, and aging properties of the compound are described and illustrated in this brochure.

"Annual Report on the Progress of Rubber Technology. Vol. XVI, 1952." Edited by T. J. Drakeley. Published by W. Heffer & Sons, Ltd., Cambridge, England, for the Institution of the Rubber Industry, 12 Whitehall, London, S.W.1. Cloth, 7½ by 9¾ inches, 178 pages. Price 1/1/0. This annual review is more than 20 pages longer than the one for 1951, further confirmation of the increase in published material experienced during the last year or more. As usual, authorities in the various fields wrote the several sections. Items covered are: planting and production of rubber; properties, applications, and utilization of latex; physics and chemistry of raw rubber; synthetic rubber; testing and equipment and specifications other than for latex; compounding ingredients; fibers and fabrics; physical and chemical properties of vulcanized rubber; tires; belting; hose and tubing; cables and electrical insulation; footwear; mechanical rubber goods; games, sport accessories, toys, etc.; surgical goods; textile-rubber composites, solvents and cements; cellular rubber; hard rubber; flooring; works processes and materials; machinery and appliances; and roads. A historical and statistical review covers the happenings in the rubber world during the year, and name and subject indices are included.

"Data on Polymers and Masterbatches Available from Office of Synthetic Rubber." Phillips Chemical Co., 318 Water St., Akron 8, O. 3 pages. This folder, compiled from information supplied by the RFC, contains a conversion chart for code numbers for rubbers and for hot and cold latices; a table on available polymers; and a table containing data on available masterbatches.

"Snell Packaged Unit Spray Dryers." Foster D. Snell, Inc., New York, N. Y. 8 pages. A description of the general mechanics of spray dryers made by the company and some of the products processed in the units appears in this pamphlet.

"Water Dispersible Colors for Use in Latex." J. C. Fitch. Report No. 53-1. E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. 4 pages. A list of the available colors and methods for their preparation is contained in this leaflet.

"Proceedings of the International Symposium on Abrasion and Wear Held at the Rubber Stichting, Delft (Holland), 1951. Reprinted from *Engineering*, London, England. 66 pages. Price, six guilders. The Rubber Stichting has now collected in book form and issued as Communication No. 211 the ten lectures, together with the discussions, presented at the above symposium. We have been informed that the lavishly illustrated, paper-backed publication is obtainable from the Rubber Stichting, Oostsingel 178, Delft, Holland. Our readers will recall that abstracts of the lectures appeared on page 451 of our January 1952, issue.

Publications of The Rubber Manufacturers Association, Inc., 444 Madison Ave., New York 22, N. Y.

"Approved Maintenance Methods for Rubber Floors." A. I. A. File Number 23-C. 12 pages. Instructions on how to clean and wax rubber floors, and a list of approved cleaning firms and waxes are contained in this bulletin.

"RMA Buyers' Specification—Latex Foam." As Revised April 1, 1953. 6 pages. The specifications for manufacture, applicable product evaluation tests, methods of testing, and test requirements for foam rubber are given. In addition, a four-page supplement to the above, entitled "Compression Range Guide," is available which suggests thicknesses to be used for various applications of the foam.

"Winning the Battle for More Tire Mileage on Passenger Cars." This publication describes and illustrates common abuses and misuses to which automobile tires and tubes are subjected and contains many hints for obtaining maximum service from automobile tire equipment.

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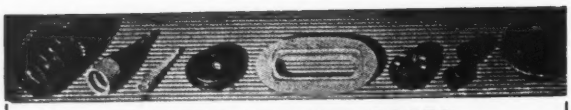

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"Ethylene Amines." Technical Bulletin F-8163. Carbide & Carbon Chemicals Co., 30 E. 42 St., New York 17, N. Y. 4 pages. Included in this bulletin are physical, chemical, and physiological properties; specifications and shipping data; and application data.

"Extruded Plastics." Anchor Plastics Co., Long Island City, N. Y. 12 pages. This brochure describes the facilities of the company, the plastic forms produced and their applications, and the various plastic materials handled by the firm, with their respective characteristics and properties.

"Heat Loss Estimate Sheet." Industrial Mineral Fiber Institute, Inc., New York, N. Y. 30¢ per dozen. 4 pages. Tables, charts, and specific instructions on how to use the Sheet are contained on the back of a $10\frac{1}{2}$- by 16-inch form intended for rapid and easy calculation of thermal insulation for heated industrial equipment.

"U. S. Packings." United States Rubber Co., Rockefeller Center, New York 20, N. Y. 112 pages. The properties and specifications of packing made by the company, recommendations for the type of packing to be used for specific applications and machines, and information on the installation and care of these materials are found in this illustrated catalog.

"Tires, Batteries, Accessories Specifications." 1953 Edition. The B. F. Goodrich Co., Akron, O. 40 pages. This replacement data manual for passenger cars and light trucks, 1938 through 1953, covers tires, chains, belts, hose, thermostats, batteries, etc.

"Natural Rubber Buying." June, 1953. The Rubber Manufacturers Association, Inc., 444 Madison Ave., New York 22, N. Y. Paper, $1. 104 pages. This book is a compilation of nine papers presented at RMA's Crude Rubber Quality Seminar in 1952, and the questions and answers discussed after each address. The topics include type samples, packing specifications, inspection techniques, methods of purchasing, and origin of types. In addition, there is a chapter on the background and need of the seminars. The booklet should be particularly useful to those in the industry charged with the responsibility for natural rubber buying.

"1953 Proceedings of the 8th Annual Industrial Engineering Conference of the Society for Advancement of Management." Society for Advancement of Management, 74 Fifth Ave., New York 11, N. Y. Price, $5. Fifteen papers presented at the Conference are contained in this booklet.

"The Microbiological Deterioration of Rubber Insulation." J. T. Blake, D. W. Kitchin, and O. S. Pratt. Simplex Wire & Cable Co., Cambridge, Mass. 8 pages. This is the third in a series of booklets which contain the findings of the authors concerning the effects of soil microorganisms on various types of rubber insulating and jacketing compounds.

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Ultracentrifuge Cell

(Continued from page 810)

Spinco Ultracentrifuge Cell Assembled (*Top*) and Parts

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The unit is cylindrically shaped and consists of an internal chamber for the mixture and an independent container for the pure, fast-settling component. Rotation of the unit reportedly causes the material in the container to drain into the top or most extreme section of the chamber and to remain there. Thus a boundary is formed whose movement is visible through a quartz lens contained in the walls of the chamber.

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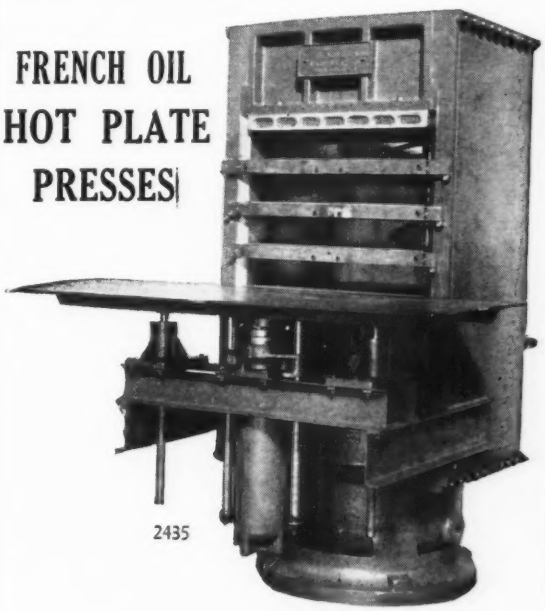

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MARKET REVIEWS

RUBBER

NATURAL rubber spot and futures prices showed a general decline over the period from July 16 to August 15. Prices dropped sharply early in the period following the Korean armistice announcement and then recovered somewhat and held firm throughout the first half of August. Active trading in the physical market was noted during the downward price movement as consumers took advantage of the competitive position of natural rubber in relation to GR-S prices. As the market firmed, interest became more spotty, and offerings dropped back amid reports that shippers were withholding deliveries in expectation of a price rise or of more attractive bids from other nations.

The steady tone of the rubber market during the first half of August came as a surprise to some traders who thought the firming trend to be a temporary reaction to the price decline in July. Market observers are now inclined to assume a cautious wait-and-see attitude before venturing any further predictions. While the buying splurge in July has built up factory inventories, the usual fall increase in rubber industry business is expected to prevent any danger of excess stocks.

The rubber trade has shown considerable interest in reports that the political situation in the Far East is deteriorating as a result of the recent declines in rubber prices. This condition may result in pressure on the United States to support the buffer stock plan to stabilize prices. This plan may come up for consideration at the September meeting of the International Rubber Study Group. In addition, pressure may be applied to persuade the administration to expedite the synthetic rubber plant disposal program.

NEW YORK SPOT MARKET
WEEK-END CLOSING PRICES

	June 27	July 18	July 25	Aug. 1	Aug. 8	Aug. 15
R. S. S.: #1	24.63	24.13	23.63	23.25	23.50	23.50
2	23.75	22.63	22.88	22.63	23.00	23.00
3	22.75	22.38	22.13	21.88	22.13	22.13
Latex Crepe						
#1 Thick	27.25	26.38	26.00	26.00	26.50	27.00
Thin	27.00	25.75	25.38	25.25	25.50	25.50
#3 Amber Blankets	21.50	21.00	21.63	20.50	20.50	20.50
Thin Brown Crepe	20.75	20.00	19.63	19.25	19.50	19.50
Flat Bark	19.50	18.50	18.13	17.75	17.88	17.88

The spot price for #1 Ribbed Smoked Sheets started the period at 24.00¢, rose to a high of 24.25¢ on July 20-22, fell sharply to a low of 23.00¢ on July 28-30, and then recovered to end the period at 23.50¢. The July monthly average spot prices for certain grades were as follows: #1 R.S.S., 23.89¢; #3 R.S.S., 22.38¢; #3 Amber Blankets, 21.04¢; and Flat Bark, 18.61¢.

COMMODITY EXCHANGE
WEEK END CLOSING PRICES

	June 27	July 18	July 25	Aug. 1	Aug. 8	Aug. 15
Futures						
Dec.	23.50	23.50	22.94	22.94	22.90	23.00
Mar.	23.45	23.25	22.75	22.70	22.75	22.85
May	23.30	23.10	22.65	22.60	22.70	22.81
July	23.20	22.95	22.55	22.60	22.65	22.70
Sept.	——	22.85	22.45	22.60	22.65	22.70
Total weekly sales, tons	2,510	2,180	720	3,020	770	700

Fluctuations in rubber futures prices on the New York Commodity Exchange followed the lead of the spot market. Total activity was only moderate and confined mostly to switching operations as dealers expressed uncertainty as to the future outlook. December futures began the period at 23.10¢, rose to a high of 23.55¢ on July 20, fell to a low of 22.20¢ on July 28, and closed at 23.20¢ on August 14.

Sales in rubber futures during the second half of July amounted to 4,730 tons, making a total for the month of 7,970 tons. Sales during the first half of August totaled only 1,470 tons.

Latex

THE latex market showed no significant changes during the period from July 16 to August 15. Demand for *Hevea* latex remained at good levels despite the summer slowdown; supplies were more than ample, and prices showed a slight decline following the trend of the crude rubber market. The price differential for *Hevea* latex over No. 1 Ribbed Smoked Sheet showed some further narrowing down, but this trend is not expected to continue in view of the necessarily high production costs in the Far East.

Indications are that stocks of *Hevea* latex will be at comfortable levels by the end of the year. Some observers expect a bullish market for latex early next year in view of foam rubber plant expansions and reports of new proposed entries in this manufacturing field. This increased latex consumption, coupled with a revival in demand from Europe, may well take up available supplies and create a rising market.

Final May and preliminary June domestic statistics on *Hevea* and synthetic rubber latices are given in the following table:

(All Figures in Long Tons, Dry Weight)

	Production	Imports	Consumption	Month-End Stocks
Natural latex				
May	0	5,548	5,395	7,648
June*	0	5,500	5,643	7,973
GR-S latices				
May	4,552	232	4,008	5,254
June*	4,080	251	4,054	5,959
Neoprene latex				
May	721	0	643	1,163
June*	739	0	651	1,106
Nitrile latices				
May	439	0	310	715
June*	425	0	358	589

*Preliminary.

SCRAP RUBBER

TRADING in the scrap rubber market remained slow during the period from July 16 to August 15. This dullness was generally attributed to seasonal influences despite the fact that Eastern reclaiming mills resumed operations in August following their annual vacation shutdowns. Some improvement in demand for scrap rubber is expected late in August, but some traders indicated their belief that the current dullness might prevail during the balance of the summer.

Scrap rubber prices, in general, held firm during the period, but, in view of the lack of activity, could be considered to be nominal quotations. Following are dealers' selling prices for scrap rubber, in carload lots, delivered to mills at the points indicated:

	Eastern Points	Akron, O.
	(Per Net Ton)	
Mixed auto tires	$12.00	$13.00
S. A. G. auto tires	Nom.	Nom.
Truck tires	Nom.	15.00
Peelings, No. 1	40.00	40.00/42.00
2	Nom.	24.00
3	16.00/18.00	18.00
	(¢ per Lb.)	
Auto tubes, mixed	2.00	2.50
Black	3.25	4.00
Red	9.75	10.25
Butyl	1.75	2.00

RECLAIMED RUBBER

DEMAND for reclaimed rubber remained at good levels during the period from July 16 to August 15. The outlook for the latter part of the year is not too optimistic in view of expected cutbacks in automobile production and, consequently, auto tire output. The availability of some low priced crude rubber grades, as a result of the recent price declines in the rubber market, is expected to cut into reclaim demand in certain applications. On the bright side, however, is the development of powdered reclaim; the butyl price rise which should stimulate demand for butyl reclaim; successful production of relatively non-staining reclaims for use in bright-colored auto floor mats; and research being conducted to combat the inroads of plastics in the manufacturing of battery containers.

Final May and preliminary June statistics on the domestic reclaimed rubber industry are now available. May figures, in long tons, follow: production, 26,839; imports, 303; consumption, 25,213; exports, 964; and month-end stocks, 31,763. Preliminary figures for June, in long tons, are: production, 26,268; imports, 310; consumption, 24,540; exports, 1,113; and month-end stocks, 32,902.

Reclaimed Rubber Prices

	Lb.
Whole tire: first line	$0.10
Fourth line	.0875
Inner tube: black	.15
Red	.2425
Butyl	.125
Pure gum, light colored	.2425
Mechanical, light colored	.135

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

RAYON

SHIPMENTS of all types of rayon by domestic producers during July amounted to 108,000,000 pounds, a decrease of 400,000 pounds from the June figure. July totals for viscose high-tenacity rayon were: shipments, 39,900,000 pounds; calculated production, 41,400,000 pounds, or 97% of rated capacity; and month-end stocks,

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8,200,000 pounds, or less than one week's supply.

During the second quarter of this year domestic producers turned out 330,500,000 pounds of rayon and acetate yarn and staple, an increase of 13% over the preceding quarter's figure. In this period 120,600,000 pounds of viscose high-tenacity yarn were produced to establish a new quarterly record for this type of yarn.

No changes were made in rayon tire yarn and fabric prices during the period from July 16 to August 15, and current prices follow:

Rayon Prices

Tire Yarns

1100/480	$0.62 / $0.63
1100/490	.62
1150/490	.62
1165/480	.63
1650/720	.61
1650/980	.61
1820/980	.61
2200/960	.60
2200/980	.60
2200/1466	.67
4400/2934	.63

Tire Fabrics

1100/490/2	.72
1650/980/2	$0.659 .73
2200/980/2	.685

current requirements. An improved market was forecast for late August as consuming plants resume full production following the summer vacation lull.

Cotton Fabrics

Drills

59-inch 1.85-yd. yd.	$0.38
2.25-yd.	.34

Osnaburgs

40-inch 2.11-yd. yd.	.2425
3.65-yd.	.16

Ducks

38-inch 1.78-yd. S. F. yd.	.3875
2.00-yd. D. F.	nom.
51.5-inch, 1.35-yd. S. F.	.51⅜
Hose and belting	.67

Raincoat Fabrics

Print cloth, 38½-inch, 64x60 yd.	.155 / .165
Sheeting, 48-inch, 4.17-yd.	nom.
52-inch, 3.85-yd.	nom.

Chafer Fabrics

14.30-oz./sq. yd. Pl. lb.	.73
11.65-oz./sq. yd. S.	.65
10.80-oz./sq. yd. S.	.6875
8.9-oz./sq. yd. S.	.70

Other Fabrics

Headlining, 59-inch, 1.65-yd., 2-ply yd.	.4875 / .49
64-inch, 1.25-yd., 2-ply	.6175 / .6225
Sateens, 53-inch, 1.32-yd.	.575
58-inch, 1.21-yd.	.6275 / .63

1953 Trends," W. J. Dooling, Hood Rubber Co.; "Low-Voltage Hazards—A Demonstration," C. C. Haggard, California-Oregon Power Co.; "Production Presents Their Side of the Story," T. J. Cain, Jr., B. F. Goodrich Co.; "Mechanical Guards Have Their Places," H. H. Rinehart, United States Rubber Co.; and "Electronics Does Its Part," R. Snyder, Goodyear Tire & Rubber Co.

J. L. Guiher and I. F. Shepard, of Goodyear, will give an address entitled, "Lights Out," at the October 21 session. A round-table discussion will then be held at which the following subjects will be covered: "Synthetic Rubber," F. T. Reynolds, University of Akron Government Laboratories, presiding, and E. Gardner, Goodyear Tire & Rubber Co., recorder; "New Problems in the Tire Plant," H. L. Andrews, Firestone Tire & Rubber Co., presiding, and J. L. Dean, also of Firestone, recorder; "Reclaim Keeps up with the Times," M. R. Batche, Xylos Rubber Co., presiding, and H. J. Baldwin, Midwest Rubber, recorder; and "Mechanical Goods Makes Big Strides," N. C. Longee, U. S. Rubber, presiding, and A. Pomeroy, Ohio Rubber Co., recorder.

COTTON AND FABRICS

NEW YORK COTTON EXCHANGE
WEEK-END CLOSING PRICES

Futures	June 27	July 18	July 25	Aug. 1	Aug. 8	Aug. 15
Dec.	33.98	34.28	34.10	34.01	33.85	33.64
Mar.	34.16	34.45	34.31	34.22	34.05	33.84
May	34.22	34.49	34.34	34.25	34.03	33.81
July	34.04	34.30	34.18	34.07	33.82	33.61
Oct.	33.24	33.55	33.42	33.42	33.48	33.33
Dec.	33.20	33.54	33.42	33.43	33.52	33.38

ACTIVITY in the cotton market on the New York Cotton Exchange during the period from July 16 to August 15 was featureless. Prices displayed a dragging tendency and fluctuated irregularly downward over a relatively narrow range, with hedging operations more than offsetting mill and export fixations. A major bearish influence on the market was the United States Department of Agriculture's latest cotton crop estimates, issued August 10, which predicted a crop of 14,695,000 bales, only 3.5% below last year's crop, and was somewhat larger than expected by market observers. Coupled with a carryover of 5,255,000 bales, the estimated crop would furnish a total supply of 19,850,000 bales, as compared with a predicted consumption of 12,500,000 bales (both domestic and export).

The spot price for 15/16-inch middling cotton started the period at a high of 34.40¢ moved downward to a low of 33.70¢ on August 13, and closed the period at 33.75¢. The same pattern was also shown by futures prices: October futures started at 34.16¢ on July 16, fell to a low of 33.43¢ on August 13, and recovered slightly to end the period at 33.48¢.

Fabrics

Trading in wide industrial cotton fabrics continued seasonably slow throughout the period. Wide sateens, broken twills, and drills sold in limited quantities for delivery into September at firm prices. Sales of headlinings and other fabrics to the automotive industry were on a conservative basis and were evidently made to fill in

Safety in Rubber

(*Continued from page 784*)

con on October 21 and will include on its agenda the election of 1953-54 officers. The general chairman of the Section, R. M. Boyle, Midwest Rubber Reclaiming Co., will preside over the meeting.

The October 20 session will hear the following addresses: "Rubber Industry Safety Data, 1952—Awards and Results—

Acrylonitrile Price Reduction

MONSANTO CHEMICAL CO., St. Louis, Mo., has announced that the price of its acrylonitrile has been reduced for tankcar quantities from 43 to 36¢ a pound. Corresponding reductions in carload and truckload drum prices, and in less than truckload prices to 37½¢ and 38½¢ a pound, respectively, have also been made. These prices are f.o.b. Texas City, Tex., freight equalized with Warners, N. J.

Estimated Automotive Pneumatic Casings and Tubes, Shipments, Production, Inventory, June, May, 1953; First Half, 1953, 1952

	June, 1953	% of Change from Preceding Month	May, 1953	First Half, 1953	First Half, 1952
Passenger Casings					
Shipments					
Original equipment	3,216,245		2,821,520	17,694,232	12,187,915
Replacement	4,819,043		4,815,793	24,769,341	22,425,280
Export	75,500		74,596	297,694	309,241
TOTAL	8,110,788	+5.17	7,711,909	42,761,267	34,922,436
Production	7,310,814	−4.50	7,655,098	44,388,976	36,544,465
Inventory end of month	12,852,485	−5.88	13,655,727	12,852,485	8,642,603
Truck and Bus Casings					
Shipments					
Original equipment	320,362		378,009	2,676,377	2,868,281
Replacement	781,557		788,044	4,722,893	3,982,411
Export	66,304		64,189	354,212	483,770
TOTAL	1,168,223	−5.04	1,230,242	7,753,482	7,334,462
Production	1,261,296	−5.27	1,331,426	8,312,764	8,543,344
Inventory end of month	3,406,258	+2.67	3,317,751	3,406,258	3,007,627
Total Automotive Casings					
Shipments					
Original equipment	3,536,607		3,199,529	20,370,609	15,056,196
Replacement	5,600,600		5,603,837	29,492,234	26,407,691
Export	141,804		138,785	651,906	793,011
TOTAL	9,279,011	+3.77	8,942,151	50,514,749	42,256,898
Production	8,572,110	−4.61	8,986,524	52,701,740	45,087,809
Inventory end of month	16,258,743	−4.21	16,973,478	16,258,743	11,650,230
Passenger, Motorcycle, Truck and Bus Inner Tubes					
Shipments					
Original equipment	3,538,603		3,199,780	20,379,347	15,021,036
Replacement	3,297,503		3,315,051	20,087,484	16,630,424
Export	70,868		71,263	353,305	565,553
TOTAL	6,906,974	+4.87	6,586,094	40,820,136	32,217,013
Production	7,034,896	+1.37	6,939,880	41,762,634	33,067,949
Inventory end of month	12,811,053	+1.74	12,591,578	12,811,053	11,049,145

NOTE: Cumulative data on this report include adjustments made in prior months.
SOURCE: The Rubber Manufacturers Association, Inc., New York, N. Y.

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- Triethylene Glycol Dicaprylate—(TG-8)
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- Di-iso-octyl Adipate—(DIOA)
- Iso-octyl Palmitate—(0-16)
- Iso-octyl Iso-decyl Phthalate—(ODP)
- Di-iso-octyl Sebacate—(DIOS)

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Pumicestone, powdered	lb.	$0.025 /	$0.045
Rottenstone, domestic	lb.	.0175/	.02

Accelerators, Organic

A-10	lb.	.40 /	.47
A-19	lb.	.52	.58
A-32	lb.	.66	.80
A-77	lb.	.47	.60
A-100	lb.	.52	.66
Accelerator 49	lb.	.53	.54
552	lb.	2.25	
808	lb.	.66	.68
833	lb.	.48 /	.535
Altax	lb.	.225	
Arazate	lb.	.66 /	.71
Beutene	lb.	.61 /	.66
Bismate	lb.	3.00	
B-J-F	lb.	.27 /	.32
Butasan	lb.	1.04	
Butazate	lb.	1.04	
Butyl Accelerator 21	lb.	.89	
Eight	lb.	1.10	1.35
Zimate	lb.	1.04	
Captax	lb.	.38	.40
C-P-B	lb.	1.95	
Cumate	lb.	1.45	
Diesterex N	lb.	.50	.57
DOTG (diorthotolylguanidine)	lb.	.57	.58
DGP (diphenylguanidine)	lb.	.48	.55
El-Sixty	lb.	.50	.57
Ethasan	lb.	1.04	
Ethazate	lb.	1.04	
Ethyl Thiurad	lb.	1.04	
Tuads	lb.	1.04	
Tuex	lb.	1.04	
Zimate	lb.	1.04	
Ethylac	lb.	.93	.95
Hepteen	lb.	.44	.50
Base	lb.	1.85	
Ledate	lb.	1.04	
M-B-T	lb.	.38	.43
-XXX	lb.	.49	.51
M-B-T-S	lb.	.48	.53
-W	lb.	.53	.55
Metac	lb.	.75	1.05
Mertax	lb.	.49	.86
Methasan	lb.	1.04	
Methazate	lb.	1.04	
Methyl Tuads	lb.	1.14	
Zimate	lb.	1.04	
Monex	lb.	1.14	
Mono-Thiurad	lb.	1.14	
Mortex	lb.	.65	.70
NOBS No. 1	lb.	.69	.71
O-X-A-F	lb.	.49	.54
Pentex	lb.	1.04	
Flour	lb.	.21	
Permalux	lb.	2.17	
Phenex	lb.	.52	.59
Pip-Pip	lb.	2.07	
R-2 Crystals	lb.	2.45	
Rotax	lb.	.49	.51
RZ-50, -50B	lb.	1.00	
S. A. 52	lb.	1.14	
57, 62, 67, 77	lb.	1.04	
66	lb.	2.50	
Santocure	lb.	.69	.76
Selenac	lb.	2.50	
Setsit No. 5	lb.	.75 /	1.05
SPDX-GH	lb.	.64 /	.69
GL	lb.	.95	
Tellurac	lb.	1.45	
Tepidone	lb.	.45 /	.48
Tetrone A	lb.	1.91	
Thiocarbanilide (A-1)	lb.	.50	.57
Thiofide	lb.	.48	.55
S	lb.	.51	.58
Thionex	lb.	1.14	
Thiotax	lb.	.38	.45
Thiurad	lb.	1.14	
Thiuram E	lb.	1.04	
M	lb.	1.14	
Trimene	lb.	.56	.62
Base	lb.	1.03 /	1.10
Tuads	lb.	1.14	
Tuex	lb.	1.14	
Ultex	lb.	1.00 /	*1.10
Unads	lb.	1.14	
Ureka Base	lb.	.66 /	.73
Vulcacure XB	lb.	.45	
ZB, ZE, ZM	lb.	.85	
Z-B-X	lb.	2.45	
Zenite	lb.	.48	.50
A	lb.	.57	.59
Special	lb.	.49	.51
Zetax	lb.	.49	.51
Zimate	lb.	1.04	

Accelerator-Activators, Inorganic

Lime, hydrated	ton	10.00 /	17.50
Litharge, comml.	lb.	.16	.161
Eagle, sublimed	lb.	.16	.161
National Lead	lb.	.16	.161
Red Lead, comml.	lb.	.17	.1725
Eagle	lb.	.17	
National Lead	lb.	.17	.1725
White lead, basic	lb.	.16	.17
Eagle, National Lead	lb.	.16 /	.17
White lead, silicate	lb.	$0.1525	$0.1875
Eagle	lb.	.17	.1875
National Lead	lb.	.1525	.1625
Zinc oxide, comml.†	lb.	.14 /	.1725

Accelerator-Activators, Organic

Aktone	lb.	.22	.23
Barak	lb.	.62	
Curade	lb.	.57	.59
D-B-A	lb.	1.95	
Delac P	lb.	.45	.52
Emersol 110	lb.	.0975	.1225
120	lb.	.1025	.1275
130	lb.	.125	.15
210 Flaine	lb.	.1025	.1325
Emery 600	lb.	.1025	.1375
Guantal	lb.	.57	.64
Hyfac 400	lb.	.0825	.1075
430	lb.	.1225	.1475
431	lb.	.1525	.1775
Laurex	lb.	.30	.33
MODIX	lb.	.295	.345
NA-22	lb.	1.50	
Plastone	lb.	.27	.30
Polyac	lb.	1.65	
Seedine	lb.	.1485	.1705
Stearex Beads	lb.	.147	.1575
Stearic acid, single pressed	lb.	.105	.1175
Double pressed	lb.	.11	.1225
Triple pressed	lb.	.1325	.145
Tonox	lb.	.515	.605
Vulklor	lb.	.75	.95
Zinc stearate	lb.	.37	.39

Alkalies

Caustic soda, flake	100 lbs.	4.10	5.30
Liquid, 50°	100 lbs.	2.55	2.75
Solid	100 lbs.	3.70	4.90

Antioxidants

AgeRite Alba	lb.	2.35	2.45
Gel	lb.	.64	.66
H. P.	lb.	.72	.74
Hipar	lb.	.98	1.00
Powder	lb.	.52	.54
Resin	lb.	.75	.77
D	lb.	.52	.54
Spar	lb.	.52	.54
Stalite	lb.	.52	.54
White	lb.	1.45	1.55
Akroflex C	lb.	.72	.79
CD	lb	.72	.74
Albasan	lb.	.69	.73
Aminox	lb.	.52	.57
Antioxidant 2246	lb.	1.65	1.68
Antisol	lb.	.23	.24
Antox	lb.	.52	.54
Aranox	lb.	3.25	
Betanox Special	lb.	.80	.85
B-L-E, -25	lb.	.52	.57
Burgess Antisun Wax	lb.	.185	
B-X-A	lb.	.52	.57
Copper Inhibiter X-872-L	lb.	2.01	
Flectol H	lb.	.52	.59
Flexamine	lb.	.72	.77
Heliozone	lb.	.26	.27
Ionol	lb.	.91	1.40
NBC	lb.	1.55	
Neozone A	lb.	.56	.58
D	lb.	.52	.54
Octamine	lb.	.52	.57
Perflectol	lb.	.61	.68
Polygard	lb.	.52	.57
Rio Resin	lb.	.60	.62
Santoflex 35	lb.	.72	.79
AW	lb.	.78	.85
B	lb.	.52	.59
BX	lb.	.63	.70
Santovar A	lb.	1.50	1.57
O	lb.	1.30	1.37
Santowhite Crystals	lb.	1.60	1.67
L	lb.	.52	.59
MK	lb.	1.29	1.36
Sharples Wax	lb.	.23	.28
Stabilite	lb.	.55	.59
Alba	lb.	.72	.79
L	lb.	.60	.64
White	lb.	.53	.62
Powder	lb.	.41	.47
Styphen I	lb.	.495	.545
Sunolite	lb.	.21	.25
Sunproof 713	lb.	.25	.30
Improved	lb.	.25	.30
Jr.	lb.	.20	.25
Thermoflex A	lb.	.98	1.00
Tonox	lb.	.52	.57
Tysonite	lb.	.24	.2475
V-G-B	lb.	.70	.75
Wing-Stay S	lb.	.52	.61
Zenite	lb.	.33	.35

Antiseptics

Copper naphthenate, 6-8%	lb.	.2275	
Pentachlorophenol	lb.	.21	.29
Resorcinol, technical	lb.	.775	.785
Zinc naphthenate, 8-10%	lb.	.245 /	.30

Blowing Agents

Ammonium, bicarbonate	lb.	.06 /	.07
Carbonate	lb.	.23 /	.24
Blowing Agent CP-975	lb.	$0.35	
Celogen	lb.	1.95	
50-C	lb.	1.01 /	$1.07
Sodium bicarbonate	100 lbs.	2.10 /	3.15
Carbonate, tech	100 lbs.	1.20 /	5.02
Sponge Paste	lb.	.20	
Unicel	lb.	.90	
ND	lb.	.79	
S	lb.	.20	

Bonding Agents

G-E Silicone Paste SS-15	lb.	4.52 /	5.10
SS-64	lb.	3.65 /	6.75
-67 Primer	lb.	7.50 /	12.50
Gen-Tac Latex	lb.	.75 /	.855
Kalabond Adhesive	gal.	6.50 /	16.00
Tie Cement	gal.	2.00 /	5.60
MDI	lb.	4.00 /	6.00
-50	lb.	2.00 /	3.00
Thixons	gal.	1.48 /	12.00
Ty-Ply BN, Q, S, 3640	gal.	6.75 /	8.00

Brake Lining Saturants

BRT 3	lb.	.018 /	.0265
Resinex L-S	lb.	.0225/	.03

Carbon Blacks‡

Conductive Channel—CC

Continental R-40	lb.	.23 /	.30
Kosmos/Dixie BB	lb.	.23 /	.30
Spheron C	lb.	.14 /	.185
I	lb.	.12 /	.165
N	lb.	.25 /	.29
Voltex	lb.	.18 /	.315

Easy Processing Channel—EPC

Continental AA	lb.	.074 /	.1225
Kosmobile 77/Dixiedensed 77	lb.	.074 /	.1225
Micronex W-6	lb.	.074 /	.1225
Spheron #9	lb.	.074 /	.1225
Texas E	lb.	.074 /	.1175
Witco #12	lb.	.074 /	.1225
Wyex	lb.	.074 /	.12

Hard Processing Channel—HPC

Continental F	lb.	.074 /	.1225
HX	lb.	.074 /	.12
Kosmobile S/Dixiedensed S	lb.	.074 /	.1225
Micronex Mk. II	lb.	.074 /	.1225
Spheron #4	lb.	.074 /	.1225
Witco #6	lb.	.074 /	.1225

Medium Processing Channel—MPC

Arrow TX	lb.	.074 /	.12
Continental A	lb.	.074 /	.1225
Kosmobile S-66/Dixiedensed S-66	lb.	.074 /	.1225
Micronex Standard	lb.	.074 /	.1225
Spheron #6	lb.	.074 /	.1225
Texas M	lb.	.074 /	.1175
Witco #1	lb.	.074 /	.1225

Conductive Furnace—CF

Aromex 115	lb.	.089 /	.129
Vulcan C	lb.	.11 /	.153
SC	lb.	.18 /	.223

Fast Extruding Furnace—FEF

Arovel	lb.	.06 /	.10
Continental FEF	lb.	.06 /	.10
Kosmos 50/Dixie 50	lb.	.06 /	.10
Statex M	lb.	.06 /	.10
Sterling SO	lb.	.06 /	.10

Fine Furnace—FF

Statex B	lb.	.065 /	.105
Sterling 99	lb.	.065 /	.105

High Abrasion Furnace—HAF

Aromex	lb.	.079 /	.125
Continex HAF	lb.	.079 /	.125
Kosmos 60/Dixie 60	lb.	.079 /	.1175
Philblack O	lb.	.079 /	.119
Statex R	lb.	.079 /	.125
Vulcan #3	lb.	.079 /	.122
6	lb.	.11 /	.153

Medium Abrasion Furnace—MAF

Philblack A	lb.	.06 /	.10

Super Abrasion Furnace—SAF

Kosmos 70/Dixie	lb.	.11 /	.155
Philblack E	lb.	.135 /	.175
I	lb.	.11 /	.15
Statex 125	lb.	.11 /	.155
Vulcan 9	lb.	.135 /	.178

General-Purpose Furnace—GPF

Sterling V	lb.	.05 /	.09

*Prices in general are f.o.b. works. Range indicates grade or quantity variations. Space limitation prevents listing of all known ingredients. Prices are not guaranteed; contact suppliers for spot prices.

†For trade names, see Color—White, Zinc Oxides.

‡At the request of the suppliers, the lowest prices shown for carbon blacks are for carloads in bags. Prices for hopper carloads are lower.

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ALL CLASSIFIED ADVERTISING MUST BE PAID IN ADVANCE

Effective July 1, 1947

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Light face type $1.25 per line (ten words)
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SITUATIONS OPEN

CHEMIST

Major chemical company in Western Pennsylvania has openings for competent Rubber Chemist for development work in tire and belt cord dipping and adhesive formulations. Applicant should have knowledge of natural or synthetic latex. Supply full particulars including training and experience and state salary expected.

**ADDRESS BOX NO. 1357,
C/O INDIA RUBBER WORLD**

OPPORTUNITY FOR A DEVELOPMENT, TOOLING, AND PROCessing rubber engineer with unusual metal-to-rubber experience, including specialty motor mounts and similar items. This is an opportunity for an energetic, practical man who can engineer special applications from design through tooling and production. Our plant is in a small Michigan city, staffed with a fine group of permanent personnel who know of this ad and need help with expanding business. Address Box No. 1358, care of INDIA RUBBER WORLD.

LATEX CHEMIST: NATIONALLY KNOWN COMPANY HAS AN opening for a man capable of assuming full responsibility for developing synthetic latices for use as paint vehicles. This work involves preparation and evaluation of mechanically stable, film forming latices from various monomers and monomer mixtures. Experience in latex emulsions specifically for paint valuable, but not as essential as fundamental knowledge of emulsion polymerization technology. Excellent opportunity for advancement to position of considerable responsibility. Liberal pension, insurance and hospitalization plans. Salary open. Location: Midwest. In first letter give complete résumé of experience, education, availability, salary requirements, and enclose small photograph. Our personnel know of this ad. Address Box No. 1359, care of INDIA RUBBER WORLD.

CHEMIST SKILLED IN COMPOUNDING FOR INDUSTRIAL rubber products, principally belting, hose, molded and sheet rubber products; in Cincinnati, Ohio, area. Long-established company with outstanding products reputation. Address Box No. 1360, care of INDIA RUBBER WORLD.

RUBBER CHEMIST

The right man for this position is offered unlimited opportunity in an established, growing West Coast company, doubled in size in the past four years and now penetrating new fields. Owing to the promotion of our Chief Chemist to Plant Managership, the need has been created of a well-trained, aggressive, key technical man in the Lab. Capability of the one who fills the position can lead to Director of Research or other fields of management.

Requirements of the applicant: graduate Chemical or Mechanical Engineer; age 30-35 with at least a 5-year record of accomplishment in mechanical rubber goods, including some knowledge of extruding; and including 3 years of compounding experience. Must know factory processing, including Banbury operation. Must also be able to comprehend and visualize diversified technical and administrative problems and make necessary decisions. Pleasing personality and ability to meet the public and handle people.

Salary commensurate with experience and ability. Please write fully, and include snapshot picture, if convenient. OLIVER TIRE & RUBBER CO., 1256 65th Street, Oakland 8, California.

SALES

NATIONWIDE RUBBER CHEMICAL COMPANY NEEDS Eastern sales representative. Experience in this field is required; however, sales experience is not necessary. Your reply will be held in strict confidence. Our employes know of this opening. Address Box No. 1361, care of INDIA RUBBER WORLD.

ENGINEER, EXPERIENCED HOSE DEVELOPMENT AND PRODuction. Progressive New Jersey manufacturing company is seeking a permanent staff engineer with knowledge of hose fabrication and braiding. Excellent opportunity, high salary. Company pays agency fee. Mail résumé to: SECURITY EMPLOYMENT AGENCY, 120 Liberty Street, New York, N. Y.

SITUATIONS WANTED

ASSISTANT SALES MANAGER, SALES ENGINEER FOR INdustrial molded and extruded products, graduate Mech. Engineer licensed, 18 years' rubber sales experience, 10 in molded goods, broad knowledge products, specifications, costs, management, and advertising, seeks permanent position with future. Address Box No. 1362, care of INDIA RUBBER WORLD.

SITUATIONS WANTED (Continued)

GENERAL MANAGER OR FACTORY MANAGER CAPABLE OF taking complete charge of a large or small plant. Experienced in compounding, milling, tubing, molding, extrusions, development, cost and maintenance, and latest finishing methods. Address Box No. 1363, care of INDIA RUBBER WORLD.

ADHESIVE CHEMIST WITH 10 YEARS' EXPERIENCE IN INdustrial adhesives and coatings including research, development, technical sales, and overall factory management desires permanent position with future. Address Box 1364, care of INDIA RUBBER WORLD.

SUPERINTENDENT DESIRES NEW CONNECTIONS. ALSO capable as chemist or production manager. Years of broad practical-technical experience manufacturing mechanical and sponge rubber products. Top-level practice for low-cost goods, development and research. Can work out costs and manufacturing specifications. Location in Midwest or far West desired. Address Box No. 1365, care of INDIA RUBBER WORLD.

CHEMICAL ENGINEER WITH MANY YEARS' ADMINISTRAtive experience in production, research, and engineering in rubber products and cements, chemicals, and plastics, desires a position of responsibility with an aggressive organization. Age 37. Fully capable of assistance to busy executive or of assuming complete responsibility for department or plant. Future possibilities of greatest importance. Address Box No. 1366, care of INDIA RUBBER WORLD.

PRODUCTION MANAGER. 15 YEARS' EXPERIENCE, SLAB SOLing sponge and floor tile products. Will relocate. Address Box No. 1370, care of INDIA RUBBER WORLD.

MACHINERY AND SUPPLIES FOR SALE

STOKES ROTARY PELLET PRESSES—RD-3 and RDS-3; KUX Model 25; Ball & Jewell Stainless Steel Rotary Cutter #1½; Mikro Pulverizers #1-SH, #1-SI, #2-TH, #2-SI, #2-DH. Large stock steel and stainless steel tanks and kettles. PERRY EQUIPMENT CORP., 1424 N. 6th St., Philadelphia 22, Pa.

**FOR SALE
AT A TREMENDOUS SAVING
NEW MODERN INCINERATOR**

Morris & Boulger incinerator designed to burn 24 tons per 24-hour period, oil fired, with Diesel-driven blower. All packed in boxes for erection. Price and detailed information on request.

DALTON SUPPLY CO.
719 — 16th Ave. Belmar, N. J.

GOOD USED MACHINERY

**WANTED:
YOUR IDLE EQUIPMENT**

1—Farrel Birmingham 6" x 13" self-contained 3-roll Calender, m.d.
1—6" x 12" Laboratory Mill, m.d.
2—Ball & Jewell #2 Rotary Cutters; 1—#1; 1, with 3 h.p. motor.
3—#28 Devine Vac. Shelf Dryers, 19-59" x 78" shelves, complete.
1—16" x 40" Rubber Mill, m.d.
4—Bolling 18" x 18", 5-opening Hydraulic Presses, 10" dia. ram.
3—Royle #4, #3, #1.
1—B.P. 20 gal. Jacketed Mixer, Double Sigma Blades.
1—300-gal. closed jack. Nickel Kettle.
Also other sizes Hydraulic Presses, Tubers, Banbury Mixers, Mills, Vulcanizers, Calenders, Pellet Presses, Cutters.

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13-16 Park Row, New York 38, N. Y. BArclay 7-0600
Cable Address: Equipment N.Y.
"Our 36th Year"

High Modulus Furnace—HMF

Continex HMF	lb.	$0.055	$0.095
Kosmos 40 /Dixie 40	lb.	.055	.095
Modulex	lb.	.055	.095
Statex 93	lb.	.055	.095
930	lb.	.047	.087
Sterling L, LL	lb.	.055	.095

Semi-Reinforcing Furnace—SRF

Continex SRF	lb.	.045	.085
Essex	lb.	.045	.085
Furnex	lb.	.045	.085
Gastex	lb.	.05	.09
Kosmos 20 /Dixie 20	lb.	.045	.085
Pelletex NS	lb.	.045	.085
Sterling NS, S	lb.	.045	.085
R	lb.	.05	.09

Fine Thermal—FT

P-33	lb.	.055	
Sterling FT	lb.	.055	

Medium Thermal—MT

Sterling MT	lb.	.035	
Thermax	lb.	.035	
Stainless	lb.	.045	

Chemical Stabilizers

Argus stabilizers	lb.	.60	1.38
Dutch Boy DS-207	lb.	.53	.55
Dyphos	lb.	.56	.58
Dythal	lb.	.40	.42
Normasal	lb.	.45	.47
Plumb-O-Sil A	lb.	.2875	.3075
B	lb.	.3025	.3225
C	lb.	.3325	.3525
Tribase	lb.	.265	.285
E	lb.	.235	.255
Eagle Basic Silicate White			
Lead 201	lb.	.1775	.1875
202	lb.	.17	.18
Stabelans	lb.	.60	1.70
Staycin 1	lb.	.65	
Vanstay HT	lb.	.90	.92
HTR	lb.	1.20	1.22
L	lb.	.33	.35
S	lb.	.65	.70
Witco Lead Stearate #50	lb.	.53	.57

Colors

Black

Black Paste #25	lb.	.22 /	.40
BK Iron Oxides	lb.	.1275	.13
Covinylblaks	lb.	.68	.145
Ivo Bone Blacks	lb.	.15	.2025
Lampblack, commL	lb.	.16	.45
Superjet	lb.	.0825	.1175
Mapico	lb.	.1275	.13
MB Mineral Blacks	lb.	.0315	.0675
Stan-Tone	lb.	.45	1.20

Blue

Du Pont	lb.	1.77	4.55
Heveatex pastes	lb.	.80	1.45
Stan-Tone	lb.	1.55 /	1.60
Toners	lb.	.30	3.50

Brown

Brown Paste #5, #10	lb.	.35	.45
Mapico	lb.	.1375	.205
Tan	lb.	.1975	.20
Metallic brown	lb.	.04	.05
Plastics brown	lb.	.0625	.07
Sienna, burnt	lb.	.0425	.155
Raw	lb.	.045	.1325
Umber, burnt	lb.	.06	.07
Raw	lb.	.0625	.07

Green

Chrome			
Oxide	lb.	.19	.40
Du Pont	lb.	.3925	1.10
G-4099, -6099	lb.	1.97	3.20
GH-9869	lb.	.3925	.3975
9976	lb.	1.00	1.15
Heveatex pastes	lb.	1.10	1.25
Stan-Tone	lb.	.95	1.85
Toners	lb.	1.75	4.60
	lb.	.35	4.00

Orange

Du Pont	lb.	2.75	
Orange Paste #13	lb.	1.35	1.50
Stan-Tone	lb.	.70	3.35
Toners	lb.	.30	1.50

Red

Antimony trisulfide	lb.	.38	.385
R. M. P. No. 3	lb.	.72	
Sulfur Free	lb.	.78	
Cadmium red lithopone	lb.	1.64	2.05
Cadmolith	lb.	1.72	2.05
Du Pont	lb.	1.47	1.80
Indian Red	lb.	.1275	
Iron oxide, red	lb.	.06	.13
Mapico	lb.	.1275	.13
Red Paste #17, I-2	lb.	.95	1.10
Rub-Er-Red	lb.	.0975	
Stan-Tone	lb.	1.05	4.05
Toners	lb.	.25	4.15

White

Antimony oxide	lb.	.275 /	.395
Burgess Iceberg	ton	50.00	
Lithopone, titanated	lb.	.10 /	.11
Cryptone BT	lb.	.10 /	.11
Titanium pigments			
Rayox LW	lb.	$0.195 /	$0.205
R-110	lb.	.215 /	.225
Ti-Cal	lb.	.075 /	.0825
Ti-Pure	lb.	.195 /	.225
Titanox A, AA, A-168	lb.	.21 /	.22
C-50	lb.	.1225 /	.1275
RA, -10, -50	lb.	.23	.24
RC	lb.	.0825	.0875
-HT, -HTX	lb.	.08 /	.085
Zopaque	lb.	.21 /	.22
Zinc oxide, commL	lb.	.14 /	.1725
Azo ZZZ-11, -44, -55	lb.	.14 /	.15
35% leaded	lb.	.1425 /	.1525
50% leaded	lb.	.14⅜ /	.15⅜
Eagle AAA, lead free	lb.	.14 /	.15
5% leaded	lb.	.14	.15
35% leaded	lb.	.1425 /	.1525
50% leaded	lb.	.14⅜ /	.15⅜
Florence Green Seal	lb.	.1575	.1675
Red Seal	lb.	.1525	.1625
White Seal	lb.	.1625 /	.1725
Horsehead XX-4, -78	lb.	.14 /	.15
Kadox -15, -17, -22	lb.	.14 /	.15
-25	lb.	.1625 /	.1725
Lehigh, 35% leaded	lb.	.1425 /	.1525
50% leaded	lb.	.14⅜ /	.15⅜
Protox-166, -167	lb.	.14 /	.15
St. Joe, lead free	lb.	.14 /	.15
Zinc sulfide, commL	lb.	.253 /	.263
Cryptone ZS	lb.	.253 /	.263

Yellow

Cadmium yellow lithopone	lb.	1.20 /	1.21
Cadmolith	lb.	1.29 /	1.37
Chrome	lb.	.31 /	.33
Du Pont	lb.	1.80 /	2.15
Iron oxide, yellow	lb.	.038 /	.1075
Mapico	lb.	.105 /	.1075
Stan-Tone	lb.	1.00 /	1.55
Toners	lb.	.50 /	1.37
Yellow D	lb.	1.25 /	1.35

Dispersing Agents

Darvan Nos. 1, 2, 3	lb.	.22 /	.30
Kreelons	lb.	.15 /	.16
Modicols	lb.	.17 /	.58
Triton R-100	lb.	.12 /	.25

Dusting Agents

Extrud-o-Lube, conc	gal.	1.54 /	1.69
Glycerized Liquid Lubricant, concentrated	gal.	1.48 /	1.63
Lubrex	lb.	.25 /	.30
Mica	lb.	.075 /	.085
Pyrax A	ton	13.50	
W. A.	ton	16.00	
Snow Crest Talc	ton	33.00 /	35.00
Vanfre	gal.	2.00 /	2.50

Extenders

BRS 700	lb.	.02 /	.0285
BRT 7	lb.	.03 /	.031
Burgess MX-50	ton	150.00	
Car-Bel-Ex A	lb.	.14	
Dielex B	lb.	.06	
Factice, Amberex	lb.	.29 /	.36
Brown	lb.	.1425 /	.268
Neophax	lb.	.157 /	.268
White	lb.	.144 /	.285
Mineral Rubbers			
Black Diamond	ton	38.00 /	40.00
Extender 600	lb.	.185	
Hard Hydrocarbon	ton	46.50 /	48.50
Hydrocarbon MR	ton	45.00 /	55.00
Parmr	ton	21.00 /	29.00
T-MR Granulated	ton	47.50 /	50.00
Nuba No. 1, 2	lb.	.0575 /	.0625
3X	lb.	.0775 /	.0825
Rubber substitute, brown	lb.	.137 /	.2625
White	lb.	.156 /	.292
Stan-Shells	ton	35.00 /	73.00
Synthetic 100	lb.	.41	

Fillers, Inert

Barytes, floated, white	ton	41.60 /	60.10
Off-color, domestic	ton	25.00	
No. 1	ton	41.35 /	60.10
2	ton	39.35 /	58.00
Sparmite	ton	75.00 /	80.00
Blanc fixe	ton	100.00 /	155.00
Clays			
Aiken	ton	14.00	
Albacar	ton	50.00 /	55.00
Aluminum Flake	ton	20.00 /	60.00
#5	ton	23.50 /	26.50
#10	ton	20.00 /	22.50
Champion	ton	14.00	
Crown	ton	14.00 /	33.00
GK Soft Clay	ton	11.00	
Hi-White R	ton	13.50	
Hydratex R	ton	28.00	
Paragon	ton	13.50 /	31.50
McNamee	ton	13.50	
RX-43	ton	33.00	
Stan-Clay	ton	28.00	
Stellar-R	ton	50.00	
Suprex	ton	14.00 /	32.00
W-1291 English	ton	53.00 /	55.00
Witco #1	ton	14.00 /	30.00
#2	ton	13.50 /	30.00
Cryptone BA, CB, MS	lb.	.08 /	.0825
Flocks			
Cotton, dark	lb.	.095 /	.112
Dyed	lb.	.55 /	.60
White	lb.	.13 /	.33
Fabrifil X-24-G	lb.	$ 0.095	
X-24-W	lb.	.135	
Filfloc 6000	lb.	.16	
F-40-900	lb.	.105	
Kalite	ton	50.00 /	$65.00
Lithopone, commL	lb.	.075 /	.085
Albalith	lb.	.075 /	.085
Astrolith	lb.	.063¾ /	.0675
Eagle	lb.	.0725 /	.075
Sunolith	lb.	.079 /	.089
Mica	lb.	.075 /	.085
Millical	ton	35.00 /	50.00
No. 1 Silica	ton	22.00 /	40.00
Non-Fer-Al	ton	30.00 /	45.00
Pyrax A	ton	12.50	
W. A.	ton	15.00	
SL Slate Flour	ton	17.00 /	25.00
Stan-White	ton	8.50 /	9.45
Super-White Silica	ton	23.00 /	43.00
Suspenso	ton	33.00 /	48.00
Terra Alba 1319	ton	27.00	
Ti-Cal	lb.	.0675	
Whiting, limestone	ton	6.00 /	15.00
Calcite	ton	21.50	
Paxinosa	ton	10.00 /	18.00
Witco	ton	8.50	

Finishes

Black-out	gal.	4.50 /	8.00
Flocks			
Cotton, dark	lb.	.095 /	.112
Dyed	lb.	.55 /	.60
White	lb.	.13 /	.33
Rayon, colored	lb.	.90 /	1.50
White	lb.	.75 /	1.25
Rubber lacquer, clear	gal.	1.00 /	2.00
Colored	gal.	2.00 /	3.50
Shoe varnish	gal.	1.45	
Talc	ton	14.00 /	38.50
Nytals	ton	25.00 /	36.00
Wax, Bees	lb.	.48 /	.57
Carnauba	lb.	.95 /	1.30
Montan	lb.	.125 /	.32
No. 118, colors	gal.	.86 /	1.41
Neutral	gal.	.76 /	1.31
Van Wax	gal.	1.45 /	1.50

Latex Compounding Ingredients

Accelerator 552	lb.	2.25	
J-127, -132	lb.	1.00 /	1.15
Aerosol	lb.	.35	
AgeRite Dispersions	lb.	.60 /	2.25
Alcogum AN-6	lb.	.05	
AN-10	lb.	.085	
Amberex Solutions	lb.	.1675 /	.18
Antifoam J-114	lb.	3.25 /	3.45
P-242	lb.	.24 /	.35
Antioxidant J-105	lb.	1.90 /	2.05
-126, -139	lb.	1.45 /	1.60
-137, -140	lb.	.55 /	.70
-138	lb.	1.05 /	1.20
-191	lb.	1.10 /	1.20
Anti-Webbing Agent X-452	lb.	.75 /	.90
Aquablaks	lb.	.085	.1775
Aquarex D	lb.	.78	
G	lb.	.21	
L	lb.	.94	
MDL	lb.	.33	
ME	lb.	.94	
NS	lb.	.60	
SMO	lb.	.50	
WAQ	lb.	.25	
Areskap 50	lb.	.30 /	.38
100, dry	lb.	.60 /	.72
Aresket 240	lb.	.30 /	.38
300, dry	lb.	.60 /	.72
Aresklene 375	lb.	.42 /	.57
Black No. 25, dispersed	lb.	.22	
Casein	lb.	.22 /	.40
Coagulant P-379	gal.	1.30 /	1.90
392	gal.	1.55 /	2.15
CW-12	lb.	.85	
37	lb.	.70	
Dispersed Sulfur No. 2	lb.	.10 /	.12
Factice dispersions	lb.	.26 /	.42
Gelling Agent P-397	lb.	.34 /	.37
Habuco Resin Emulsion			
#226	lb.	.227 /	.232
2246-A	lb.	.275 /	.28
3408-B	lb.	.18 /	.19
Laton L	lb.	.075 /	.0775
Ludox	lb.	.1675 /	.1925
Marmix	lb.	.41 /	.48
Micronex, colloidal	lb.	.06 /	.07
Pliolite Latex 150, 190	lb.	.32 /	.41
170	lb.	.37 /	.46
Resin Emulsion A-2	lb.	.16 /	.25
A-155TH	lb.	.195 /	.265
P-370	lb.	.125 /	.175
X-210	lb.	.12 /	.32
Resin V	lb.	.13 /	
Santomerse D	lb.	.44 /	.65
S	lb.	.13 /	.25
Stablex A	lb.	.80 /	1.10
B, G	lb.	.50 /	.95
K	lb.	.27 /	.35
P	lb.	.35 /	.50
T	lb.	.17 /	.22
Sulfur dispersions	lb.	.12 /	.25
Webnix #34	lb.	1.50 /	2.25

Mold Lubricants

Aquarex Compounds	lb.	.28 /	.97
Colite Concentrate	gal.	.90 /	1.15
ELA	lb.	.82	
DC Mold Release Fluid	lb.	4.14 /	6.00
Emulsion Nos. 35, 35A, 35B	lb.	1.46 /	3.50

CLASSIFIED ADVERTISEMENTS

Continued

MACHINERY AND SUPPLIES FOR SALE (Continued)

FOR SALE: FARREL 16" x 48" AND 15" x 36" 2-ROLL RUBBER Mills, and other sizes up to 84". Also new lab. 6" x 12" & 6" x 16" Mixing Mills and Calenders. Extruders, 1" to 6". Baker-Perkins Mixers 100, 50, and 9 gals., heavy duty double-arm. New Loomis 340-ton & 50-ton Hydr. Presses. 350-ton upstroke Hydr. Press, 22" x 24" platens. Brunswick 200-ton Hydraulic Presses 21" x 21" platens. Watson-Stillman 30" x 60", 150-ton. Large stock of hydraulic presses from 12" x 12" to 48" x 48", platens from 50 to 2,000 tons. Hydraulic Pumps and Accumulators. Rotary Cutters. Stokes Automatic Molding Presses, Single punch & rotary Preform Machines. Banbury Mixers, Crushers, Churns, Rubber Bale Cutters, etc. SEND FOR SPECIAL BULLETIN. WE BUY YOUR SURPLUS MACHINERY. STEIN EQUIPMENT CO., 107 — 8th St., Brooklyn 15, N. Y. STerling 8-1944.

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MILLS · EXTRUDERS · CALENDERS

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VULCANIZERS · CHOPPERS · BALE CUTTERS

SPECIAL . . .
Immediate Delivery—
Fair Price

1—18" x 45" Rubber mill with enclosed reduction drive and 50 HP motor and starter controls. Floor level installation.

1—30 x 30 Hyd. press, 16" ram, 16" opening. Hyd. unit including 4-way valve and timer. F.O.B. Indiana location; can be inspected.

5—French Oil Semi-Automatic Slab Side—Self Contained. 30" ram, 30" daylight, 30 x 54" platen area. Vickers Pump unit 15 HP—1800 RPM 220/440/60 cycle.

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JAMAICA 2, N. Y.

USED MACHINERY
FOR SALE

1—Ambaco Model 3A Continuous Baler.
1—Thropp 2-roll Rubber Mill 10"x24".
2—Thropp 2-roll Rubber Mills, 18"x50".
1—Thropp 2-roll Rubber Mill 14" x 30".
1—Adamson Vulcanizer, 2' x 12' with quick opening door.
1—Ball & Jewell Stainless Steel #0 Rotary Cutter with Motor.
1—Paul O. Abbe #2 Master Rotary Cutter with Ball Bearings.
1—Welding Engr. Stainless Steel #2 Extruder.
1—Sprout Waldron Attrition Mill, Type 36 with 2 — 75 HP Motors.
1—Baker Perkins Stainless Steel double-arm jacketed mixer, Sigma blade, 9 gal.

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183-189 ORATON ST. CABLE "URME" NEWARK 4, N. J.

DC 7	lb.	$6.20 /	$6.80
Glycerized Liquid Lubricant, concentrated	gal.	1.48 /	1.63
Lubrex	lb.	.25 /	.30
Lubri-Flo	gal.	10.00 /	12.05
Mold Paste	lb.	.25	
Monten Wax	lb.	.57	
Para Lube	lb.	.046 /	.048
Polyglycol E 4000	lb.	.33 /	.39
Rubber-Glo	gal.	.94 /	.97
Soap, Hawkeye	lb.	1.35 /	1.45
Purity	lb.	.155 /	.165
Sodium stearate	lb.	.40	
Vanfre	gal.	2.50 /	3.00

Odorants

Alamasks	lb.	.75 /	6.50
Curodex 19	lb.	4.75	
188	lb.	5.75	
198	lb.	6.75	
Rodo No. 0	lb.	4.00 /	4.50
No. 10	lb.	5.00 /	5.50

Plasticizers and Softeners

Akroflex C	lb.	.695 /	.715
Aro Lene #1980	lb.	.10 /	.12
Baker AA Oil	lb.	.235	.28
Crystal O Oil	lb.	.235	.295
Processed oils	lb.	.24	.275
Bardol	lb.	.0275 /	0375
639	lb.	.0275 /	045
B	lb.	.0625 /	065
Bondogen	lb.	.55 /	.60
BRC 20	lb.	.15 /	.175
30	lb.	.0125 /	.021
521	lb.	.019 /	.02
BRH 2	lb.	.0213 /	.0351
BRS 700	lb.	.02 /	.0285
BRT 7	lb.	.03 /	.031
BRV	lb.	.0475 /	.0565
Bunarex Liquid	lb.	.0425 /	.0555
Resins	lb.	.065 /	.1225
Bunnatol G. S.	lb.	.40 /	.505
Butac	lb.	.125 /	.135
BxDC	lb.	.40 /	.41
Cabflex DDA	lb.	.5075 /	.5175
DDP	lb.	.3975 /	.4075
Di-BA	lb.	.4525 /	.4625
OA	lb.	.4675 /	.4775
OP	lb.	.3675 /	.3775
OZ	lb.	.5375 /	.5475
Cabol 100	lb.	.04 /	07
Carbonex S	lb.	.0475 /	.05
Chlorowax 40	lb.	.13 /	.2075
70	lb.	.18 /	.24
S	lb.	.21 /	.27
Contogums	lb.	.0875 /	.111
Cumar EX	lb.	.0525	
MH	lb.	.065 /	.11
V	lb.	.0975 /	.1275
Darex Plasticizer DBM	lb.	.30 /	.3275
Dielex B	lb.	.06	
Dipolymer Oil	gal.	.33 /	.38
Dispersing Oil No. 10	lb.	.06 /	.0625
Duraplex C-50 LV, 100°	lb.	.25 /	.295
Dutrex 6	lb.	.025 /	.035
Fortex	lb.	.125 /	.145
Galex W-100	lb.	.135 /	.1725
W-100D	lb.	.1325 /	.17
Gilsowax B	lb.	.09 /	.11
Good-rite GP-233	lb.	.45 /	.59
GP-261	lb.	.37 /	.49
Harchemex	lb.	.3025 /	.39
Harflex 500	lb.	.34 /	.3675
Heavy Resin Oil	lb.	.0225 /	.0375
HSC-13	lb.	.27 /	.30
Indoil Compound 51-S	lb.	1.00 /	1.10
Indonex	gal.	.11 /	.19
Marvinol plasticizers	lb.	.28 /	.8825
Nevillac	lb.	.31 /	.85
Neville R. Resins	lb.	.13 /	.35
Nevinol	lb.	.20	
No. 1-D heavy oil	lb.	.055 /	.065
Palmalene	lb.	.15	
Paraflex BX-1	lb.	.185 /	.225
Para Flux, regular	gal.	.10 /	.2125
No. 2016	gal.	.165 /	.24
2332	gal.	.11	
4205	lb.	.1075	.2125
Para Lube	lb.	.046 /	.048
Resins	lb.	.04 /	.045
Paradene Resins	lb.	.065 /	.075
Peptizene #2	lb.	.90	
Pepton 22	lb.	.79 /	.82
Picco Resins	lb.	.13 /	.185
480 Oilproof Series	lb.	.18 /	.23
S. O. S.	gal.	.29 /	.34
Piccocizers	lb.	.04 /	.068
Piccolastic Resins	lb.	.1855 /	.34
Piccolyte Resins	lb.	.185 /	.25
Piccopale Resins	lb.	.12 /	.135
Piccoumaron Resins	lb.	.07 /	.185
Piccovars	lb.	.145 /	.20
Piccovol	lb.	.025 /	.038
Pictar	gal.	.25 /	.30
Pigmentar, American	lb.	.041	.0678
Sunny South	lb.	.0389	.0678
Pigmentaroil, American	lb.	.041	.0678
Sunny South	lb.	.0389	.0678
Pitch, Burgundy, Sunny South	lb.	.098 /	.1025
Plasticizer 35	lb.	.205 /	.24
36	lb.	.305 /	.34
42	lb.	.34 /	.40
B	lb.	.35 /	.45
DP-520	lb.	$.435 /	$.455
MT-511	lb.	.535 /	.565
ODN	lb.	.32 /	.37
PX series	lb.	.385 /	.75
SC	lb.	.61 /	.69
Plastogen	lb.	.0775 /	.08
Plastone	lb.	.22 /	.30
Polyvizers	lb.	.40 /	.4775
PT67 Light Pine Oil	gal.	.60	
101 Pine Tar Oil	gal.	.3485 /	.455
400 Light Pine Tar	gal.	.361 /	.47
600 Med. Pine Tar	gal.	.365 /	.475
800 Heavy Pine Tar	gal.	.369 /	.48
R-19, R-21 Resins	lb.	.1075 /	
Reogen	lb.	.1325 /	.135
Resin C pitch	lb.	.0225 /	.031
R6-3	lb.	.38 /	.40
Resinex	lb.	.0325 /	.0375
L-4	lb.	.0225 /	.03
Rosin Oil, Sunny South	gal.	.58 /	.875
RPA No. 2	lb.	.78	
3	lb.	.47	
Conc.	lb.	.97	
5	lb.	.59	
RSN Flux	gal.	.10 /	.19
Rubber Oil B-5	lb.	.0225 /	.0355
Rubberol	lb.	.2575	.2725
Seedine	lb.	.1485 /	.1705
Softener #20	gal.	.10 /	.20
Special Rubber Resin	100 lb.	.1675 /	.2175
Starex Beads	lb.	.1475 /	.1575
Starite	lb.	.095 /	.10
Syn-Tac	gal.	.33 /	.35
Synthol	lb.	.2475	
Thiokol TP-90B	lb.	.59 /	.69
-95, -98	lb.	.65	
TR-11	lb.	.035	
Turgum S	lb.	.1075 /	.1175
Tysonite	lb.	.24 /	.2475
X-1 Resinous Oil	lb.	.021 /	.0275
XX-100 Resin	lb.	.0525	

Reclaiming Oils

Bardol	lb.	.0275 /	.0375
639	lb.	.0275 /	.045
B	lb.	.0625 /	.065
BRH 2	lb.	.0213 /	.0351
BRT 4	lb.	.025 /	.026
BRV	lb.	.0475 /	.0565
Burco-RA	lb.	.055 /	.0825
BWH-1	lb.	.16 /	18
Dipolymer Oil	gal.	.33 /	.43
Dispersing Oil No. 10	lb.	.06 /	.0625
Heavy Resin Oil	lb.	.0225 /	.0375
LX-759	gal.	.16 /	.165
-774, -777	gal.	.23 /	.33
No. 1621	lb.	.025 /	.035
3186	gal.	.28 /	.295
Picco 6535	gal.	.25 /	.30
C-33	gal.	.215 /	.315
-42	gal.	.23 /	.33
D-4	gal.	.27 /	.37
F-5	gal.	.25 /	.35
O-Oil	gal.	.286 /	.36
PT 101 Pine Tar Oil	gal.	.3485 /	.455
150 Pine Solvent	gal.	.44	
Reclaiming Oil #3186	gal.	.28 /	.385
-G	gal.	.25 /	.365
4039-M	gal.	.3275 /	.3975
-V	gal.	.30 /	.37
RR-10	lb.	.36	
S. R. O.	lb.	.015 /	.0225
X-1 Resinous Oil	lb.	.021 /	.03

Reinforcers, Other Than Carbon Black

BRC 20	lb.	.15 /	.175
30	lb.	.0125 /	.021
521	lb.	.019 /	.02
Bunarex resins	lb.	.065 /	.1225
Calcene NC	ton	72.50 /	92.50
TM	ton	75.00 /	95.00
Calco S. A.	lb.	.85 /	.88
Carbonex S	lb.	.0475 /	.05
Clays			
Aiken	ton	14.00	
Aluminum Flake	ton	20.00 /	60.00
#5	ton	23.50 /	26.50
#10	ton	20.00 /	22.50
Buca	ton	40.00	
Burgess Iceberg	ton	50.00	
Pigment No. 20	ton	35.00	
30	ton	37.00	
Catalpo	ton	30.00	
Crown	ton	14.00 /	33.00
Dixie	ton	14.00	
L. G. B.	ton	17.00	
Paragon (R)	ton	13.50 /	33.00
Pigment No. 33	ton	30.00	
Suprex	ton	14.00 /	33.50
Witco No. 1	ton	14.00 /	30.00
No. 2	ton	13.50 /	30.00
Clearcarb	lb.	.1175 /	.1225
Cumar EX	lb.	.0525	
MH	lb.	.065 /	.1175
V	lb.	.0975 /	.1275
Good-rite Resin 50	lb.	.42 /	.45
K Series Polymers	lb.	.15 /	.37
Hi-Sil	lb.	.10 /	.115
C	lb.	.11 /	.125
Kralac A-EP	lb.	.43 /	.54
Marbon resins	lb.	.42 /	.49
Multifex	ton	140.00 /	155.00
MM	ton	110.00 /	125.00
Neville R. Resins	lb.	.10 /	.155
Para Resins 2457, 2718	lb.	.04 /	.45
Pico Resins	lb.	.13 /	.185
Piccolyte Resins	lb.	$.185 /	$.25
Piccoumaron Resins	lb.	.07 /	.185
Piccovars	lb.	.145 /	.20
Pliolite NR types	lb.	.98 /	1.33
S-3, -6, -6B	lb.	.42 /	.49
S-6C	lb.	.52 /	.59
Master batches	lb.	.44 /	.75
Resin C Pitch	lb.	.0225 /	.031
Resinex	lb.	.0325 /	.0375
Rubber Resin LM-4	lb.	.28 /	.35
S-Polymers	lb.	.44	
Silene EF	ton	120.00 /	140.00
Silvacons	ton	55.00 /	85.00
Super Multifex	ton	160.00 /	175.00
Witcarb R	ton	105.00 /	120.00
-12	ton	45.00	66.00
Zeolex 20	ton	120.00 /	140.00
Zinc oxide, commercial†	lb.	.14 /	.1725

Retarders

Cumar RH	lb.	.105	
Delac J	lb.	.55 /	.60
E-S-E-N	lb.	.35 /	.37
Good-rite Vultrol	lb.	.62	.66
R-17 Resin	lb.	.1075 /	.36
Retarder ASA	lb.	.57	
PD	lb.	.35 /	.37
TCM	lb.	.65	
W	lb.	.45	
Retardex	lb.	.47 /	.50
RM	lb.	1.25	
Thionex	lb.	1.25	

Solvents

2-50-W Hi-Flash Solvent	gal.	.41	
3-BX Naphtha	gal.	.37	
Bondogen	lb.	.55 /	.60
Cosols	gal.	.37 /	.48
Dichloro Pentanes	lb.	.04 /	.07
Dipentene DD	gal.	.445 /	.68
GVL	lb.	1.00	
LX-572 Oil	gal.	.27 /	.32
-748 Solvent	gal.	.16 /	.23
Nevsol H	gal.	.19 /	.29
HF, T	gal.	.24 /	.34
Penetrell	gal.	.445 /	.68
Picco Hi-Solv Solvents	gal.	.19 /	.45
Pine Oil DD	gal.	.755 /	.955
PT 150 Pine Solvent	gal.	.44	
Skellysolve-E	gal.	.153	
-H	gal.	.133	
-R, -V	gal.	.109	
-S	gal.	.099	

Synthetic Resins

Geon Latices (dry wt.)	lb.	.38 /	.52
Paste Resins	lb.	.38 /	.59
Plastics	lb.	.35 /	.80
Polyblend	lb.	.475 /	.575
Polyvinyl resins	lb.	.38 /	.70
Kenflex A, L	lb.	.26 /	.27
B	lb.	.23 /	.24
N	lb.	.18 /	.19
Kralastic	lb.	.65 /	1.30
Marvinol VR-10, -20	lb.	.36 /	.52

Synthetic Rubber and Latices

Butaprene Latex (dry wt.)			
NL types	lb.	.47 /	.52
NXM types	lb.	.55 /	.60
Butaprene NAA	lb.	.54 /	.55
NF	lb.	.49 /	.50
NL	lb.	.50 /	.51
NXM	lb.	.58 /	.59
Chemigum 30N4NS, 50N4NS	lb.	.50 /	.57
N1NS	lb.	.64 /	.71
N3NS	lb.	.58 /	.65
Latex (dry wt.)			
101 types	lb.	.35 /	.42
200, 245 types	lb.	.47 /	.55
235 types	lb.	.55 /	.63
Hycar 1001, 1011	lb.	.58 /	.59
1002, 1012	lb.	.50 /	.51
1022	lb.	.51 /	.52
1411	lb.	.62 /	.63
2001	lb.	.55 /	.56
4021	lb.	1.34 /	1.35
Hycar Latex (dry wt.)			
1551, 1561	lb.	.55 /	.60
1552, 1562	lb.	.47 /	.52
Neoprene Latex (dry wt.)			
Type 571, 842-A	lb.	.37 /	.48
572	lb.	.39 /	.50
601-A, 735	lb.	.40 /	.51
735	lb.	.38 /	.49
Neoprene Type AC, CG	lb.	.55 /	.80
GN, GN-A, W, WHV	lb.	.41 /	.44
GRT, S	lb.	.42 /	.45
KNR	lb.	.75 /	.78
Q	lb.	1.00 /	1.03
WRT	lb.	.45 /	.48
Paracril 18-80	lb.	.60 /	.61
AJ	lb.	.485 /	.495
Paracril			
B, BJ	lb.	.50 /	.51
BV	lb.	.51 /	.52
C	lb.	.58 /	.59
CS, CV	lb.	.59 /	.60
Paraplex X-100	lb.	1.00	
Silastic	lb.	2.35 /	4.05
Thiokol LP-2, -3	lb.	.96	
-8	lb.	1.25	
PR-1	lb.	1.95	
Type A	lb.	.47	
FA	lb.	.64	
ST	lb.	1.00	

CLASSIFIED ADVERTISEMENTS

(Continued)

MACHINERY AND SUPPLIES FOR SALE (Continued)

FOR SALE: 1—FARREL 16" x 42" RUBBER MILL, MD. 2—24" x 54" 8-opening hydraulic presses. 2—Royle 6" and 8" strainers. Also Banbury mixers, calenders, tubers, cutters, mixers, etc. Send us your inquiries. CHEMICAL & PROCESS MACHINERY CORP., 148 Grand Street, New York 13, N. Y. WO 4-8130.

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WANTED: RUBBER MILL, 6" x 12", LABORATORY, USED, IN good operating condition. Specify age, manufacturer, and price asked. Address Box No. 1367, care of INDIA RUBBER WORLD.

WANTED: STEAM PLATENS APPROXIMATELY 64" LONG—ANY width—about 250 square ft. required. Also 60"-66" three-roll calender. Address Box No. 1369, care of INDIA RUBBER WORLD.

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WANTED: *CHEMICAL ABSTRACTS*, VOL. 30, NO. 6. *Chemical Reviews*, Vol. 47, No. 1 and No. 3. *Rubber Chemistry & Technology*, Vol. 16, No. 2; Vol. 15, Nos. 1, 2, 3, 4; Vol. 14, No. 3; Vol. 13, No. 2. ARGUS, 633 Court St., Brooklyn 31, N. Y.

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..... 1953

Enclosed find $ ..... for which enter subscription to the INDIA RUBBER WORLD, beginning with the ..... number.

Name .....

Firm .....

Street .....

City .....

Thiokol Latex (dry wt.)		
Type ME	lb.	$0.85
MX	lb.	.70
WD-2	lb.	.92
-6	lb.	.70

Tackifiers

Bunarex resins	lb.	.065 / $0.1225
Chlorowax 70	lb.	.18 / .24
Contogums	lb.	.0875 / .11
Galex W-100	lb.	.155 / .1925
W-100D	lb.	.1525 / .19
Indopol H-100	gal.	.85 / 1.00
H-300	gal.	1.00 / 1.16
Natac	lb.	.12 / .13
Nevindene	lb.	.15 / .18
Picco Resins	lb.	.13 / .185
Piccolastic Resins	lb.	.1855 / .34
Piccolyte Resins	lb.	.185 / .25
Piccopale Resins	lb.	.12 / .135
Piccoumaron Resins	lb.	.07 / .185
Synthetic 100	lb.	.41
Synthol	lb.	.2475 / .2625

Vulcanizing Agents

Dibenzo G-M-F	lb.	2.60
G-M-F #113	lb.	.90
G-M-F	lb.	2.60
#117	lb.	.90
Ko-Blend I. S.	lb.	.385
Litharge, commercial	lb.	.16 / .161
Eagle, sublimed	lb.	.16 / .161
National Lead	lb.	.16 / .161
Magnesium oxide	lb.	.31
Red lead, commercial	lb.	.17 / .1725
Eagle	lb.	.17
National Lead	lb.	.17 / .1725
Sulfasan R	lb.	1.50
Sulfur flour, commil.	100 lbs.	2.30 / 3.05
Calco	100 lbs.	2.15 / 7.50
Crystex	lb.	.195
Insoluble 60	lb.	.125 / .13
Rubbermakers	100 lbs.	2.40 / 4.30
Stauffer	lb.	.0215 / .0335
Telloy	lb.	2.50
Vandex	lb.	4.75
Vultac No. 2	lb.	.47 / .755
3	lb.	.51 / .795
White lead silicate	lb.	.1525 / .1875
Eagle	lb.	.17 / .1875
National Lead	lb.	.1525 / .1625

Trade Lists Available

The Commercial Intelligence Division recently published the following trade lists, of which mimeographed copies may be obtained by firms domiciled in the United States from this Division and from Department of Commerce Field Offices. The price is $1 a list for each country.

Automotive Vehicle & Equipment Importers & Dealers: Chile.

Boot & Shoe Importers & Dealers: Italy.

Chemical Importers & Dealers: Cuba; Ecuador; Hong Kong; Iran.

Electrical Supply & Equipment Importers & Dealers: Burma; Western Germany and Berlin; Cuba; Malaya; Surinam; Switzerland.

Office Supply & Equipment Importers & Dealers: British Guiana; Peru; Switzerland.

Sporting Goods, Toys & Game Importers: Nicaragua.

U. S. Imports, Exports, and Reexports of Crude and Manufactured Rubber

Imports for Consumption of Crude and Manufactured Rubber

	April, 1953 Quantity	Value
UNMANUFACTURED, LBS.		
Crude rubber	121,569,905	$29,729,394
Latex	14,116,665	4,206,828
Guayule	8,081	1,362
Balata	691,195	196,917
Jelutong or Pontianak	193,931	76,143
Gutta percha	15,711	7,761
Crude chicle	148,351	81,594
Synthetic rubber	2,902,750	772,530
Reclaimed rubber	712,665	43,515
Scrap rubber	2,623,019	110,812
TOTALS	142,982,273	$35,226,856
MANUFACTURED		
Rubber tires		
Auto, etc. no.	6,150	$362,049
Bicycles no.	4,329	4,715
Other no.	530	253
Inner tubes		
Auto, etc. no.	29,865	13,810
Footwear		
Boots prs.	2,493	4,896
Shoes and overshoes prs.	18,949	11,747
Rubber-soled canvas shoes prs.	12,833	15,251
Athletic balls		
Golf no.	38,928	10,045
Tennis no.	42,828	9,357
Other no.	110,908	17,985
Toys	.....	42,551
Hard rubber goods		
Combs no.	14,256	1,366
Other	.....	24,164
Rubberized printing blankets lbs.	642	1,241
Rubber and cotton packing lbs.	3,701	6,330
Gaskets and valve packing	.....	253
Molded insulators	.....	20,021
Belting lbs.	1,800	3,085
Hose and tubing	.....	3,714
Gloves prs.	67,560	16,122
Nipples and pacifiers gr.	2,700	3,067
Instruments doz.	3,923	8,757
Heels and soles lbs.	7,000	6,508
Bands lbs.	101	503
Gutta percha manufactures lbs.	1,250	1,579
Synthetic rubber products	.....	11,643
Other soft rubber goods	.....	150,047
TOTALS	.....	$751,059
GRAND TOTALS, ALL RUBBER IMPORTS	.....	$35,977,915

Reexports of Foreign Merchandise

UNMANUFACTURED, LBS.		
Crude rubber	1,550,295	$446,231
Balata, gutta percha, etc.	6,606	5,615
TOTALS	1,556,901	$451,846

	April, 1953 Quantity	Value
MANUFACTURED		
Rubber drug sundries	.....	$427
And rubberized clothing	.....	150
Toys, balls, novelties	.....	488
Farm tractor casings no.	6	307
Other natural and synthetic rubber manufactures	.....	294
TOTALS	...	$1,666
GRAND TOTALS, ALL RUBBER REEXPORTS	.....	$453,512

Exports of Domestic Merchandise

UNMANUFACTURED, LBS.		
Chicle and chewing gum bases	410,163	$177,866
Balata, gutta percha, etc.	950	2,425
Synthetic rubbers		
GR-S type	927,349	243,981
Butyl	104,998	25,247
Neoprene	1,831,467	759,721
Nitrile type	469,270	252,442
Other	26,294	26,818
Reclaimed rubber	2,824,624	239,025
Scrap rubber	2,266,095	58,661
TOTALS	8,865,210	$1,726,186
MANUFACTURED		
Rubber cement gals.	95,277	$183,962
And rubberized fabric sq. yds.	186,393	178,844
Clothing	.....	133,355
Footwear		
Boots and shoes prs.	13,982	71,755
Rubber-soled canvas shoes prs.	24,022	42,926
Heels doz. prs.	71,828	82,097
Soles, soling, top-lift sheets lbs.	852,981	213,519
Gloves and mittens doz. prs.	18,555	79,694
Drug sundries	.....	210,738
Toys, balls, novelties	.....	66,026
Hard rubber goods		
Battery boxes no.	21,493	37,447
Other electrical goods lbs.	96,034	73,369
Other	.....	27,686
Rubber tires and casings		
Truck and bus no.	64,497	3,664,244
Auto and motorcycle no.	47,993	622,168
Aircraft no.	1,325	116,454
Off-the-road no.	10,120	982,578
Farm tractor no.	7,398	284,534
Implement no.	1,507	21,173
Other no.	10,328	44,253
Inner tubes		
Auto no.	28,091	53,233
Truck and bus no.	51,483	396,098
Aircraft no.	1,083	9,899
Other no.	33,601	71,247
Solid tires		
Truck and commercial no.	1,389	22,007
Tire repair material		
Camelback lbs.	591,599	173,110
Other lbs.	437,968	477,932
Tape, except medical and friction lbs.	54,145	49,990
Belting		
V-type, auto, fan lbs.	104,144	142,629
Transmission		
V-type lbs.	112,640	251,710
Flat belts lbs.	53,646	78,529
Conveyor and elevator lbs.	95,907	63,241
Other lbs.	5,682	10,951
Hose		
Molded and braided lbs.	316,508	259,548
Wrapped and hand built lbs.	169,393	150,876
Other hose and tubing lbs.	96,745	127,250
Packing		
Sheet type lbs.	49,750	39,270
Other lbs.	139,987	198,837
Tiling and flooring lbs.	170,567	44,980
Mats and matting lbs.	366,326	117,408
Thread: bare lbs.	17,377	31,755
Textile covered lbs.	21,234	70,709
Compounded rubber for further manufacture lbs.	1,000,851	292,456
Other rubber manufactures	.....	608,919
TOTALS	.....	$10,879,046
GRAND TOTALS, ALL RUBBER EXPORTS	.....	$12,605,232

SOURCE: Bureau of the Census, United States Department of Commerce, Washington, D. C.

United States Rubber Statistics — May, 1953

(All Figures in Long Tons, Dry Weight)

	New Supply			Distribution		
	Production	Imports	Total	Consumption	Exports	Month-End Stocks
Natural rubber, total	0	50,732	50,732	41,494	521	105,884
Latex, total	0	5,548	5,548	5,395	0	7,648
Rubber and latex, total	0	56,280	56,280	46,889	521	113,532
Synthetic rubbers, total	*76,854	1,058	86,360	71,234	2,274	132,109
	† 8,448					
GR-S types‡	*70,216	869	71,116	57,105	943	100,873
	† 31					
Butyl	*6,638	189	6,827	7,325	3	18,376
Neoprene‡	†6,665	0	6,665	5,542	1,127	8,986
Nitrile types‡	†1,752	0	1,752	1,262	201	3,874
Natural rubber and latex, and synthetic rubbers, total	85,302	57,338	142,640	118,123	2,795	245,641
Reclaimed rubber, total	26,839	303	27,142	25,213	964	31,763
GRAND TOTALS	112,141	57,641	169,782	143,336	3,759	277,404

*Government plant production.
†Private plant production.
‡Includes latices.
SOURCE: Rubber Division, NPA, United States Department of Commerce, Washington, D. C.

INDEX TO ADVERTISERS

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A

ABC Rubber Co. 839
Ace Machine & Mould Co., Inc. 744
Adamson United Co. 739
Aetna-Standard Engineering Co. 713
Akron Equipment Co., The 831
Akron Rubber Machinery Co. 837
Albert, L., & Son 837
Alco Oil & Chemical Corp. 819
Aluminum Flake Co. 824
American Cyanamid Co., Calco Chemical Div. 757
American Resinous Chemicals Corp. ..... —
American Zinc Sales Co. ..... —
Ames, B. C., Co. ..... —
Argus Chemical Laboratory 756

B

Baird Rubber & Trading Co., Inc 808
Baker Castor Oil Co., The 727
Barco Manufacturing Co. ..... —
Barr Rubber Products Co., The 826
Barrett Division (Allied Chemical & Dye Corp.) .. 811
Barry, B. J., & Co. 833
Barry, Lawrence N. 837
Berlow & Schlosser Co. 824, 826
Binney & Smith Co. Insert 777, 778
Black Rock Mfg. Co. 754
Blaw-Knox Co. 742
Bolling, Stewart, & Co., Inc. 746
Bonwitt, Eric 839
Bridgwater Machine Co., The (Athens Machine Division) 726
Brockton Tool Co. 833
Brooklyn Color Works, Inc. —
Burgess Pigment Co. ..... —

C

Cabot, Godfrey L., Inc. Front Cover, 822
Cambridge Instrument Co., Inc. 821
Carbide & Carbon Chemicals Co., A Division of Union Carbide & Carbon Corp. —
Carey, Philip, Mfg. Co., The —
Carter Bell Mfg. Co., The 738
Claremont Waste Mfg. Co. 831
CLASSIFIED ADVERTISEMENTS 835, 837, 839
Cleveland Liner & Mfg. Co., The ..... Back Cover
Colledge, E. W., General Sales Agent, Inc. ..... —
Columbia-Southern Chemical Corp. 745
Columbian Carbon Co. Insert 777, 778
Columbian Carbon Co. Mapico Color Division .. 750
Consolidated Products Co., Inc. 835
Continental Carbon Co. 803
CONSULTANTS & ENGINEERS 826

D

D P R, Incorporated, A Subsidiary of H. V. Hardman Co. 812
Davis-Standard Sales Corp. 752
Dayton Rubber Co., The .. 818
Diamond Alkali Co. ..... —
Dow Corning Corp. 813
du Pont de Nemours, E. I., & Co., Inc.:
Aromatics Section ..... —
Grasselli Chemicals Dept. 730, 731
Polychemicals Dept. .. 717
Rubber Chemicals Div. Inside Front Cover

E

Eagle-Picher Co., The 823
Elm City Rubber Co., The —
Emery Industries, Inc. ..... —
Erie Engine & Mfg. Co. .. 806
Erie Foundry Co. 723

F

Farrel-Birmingham Co., Inc. 715, 735
Ferry Machine Co. ..... —
Fidelity Machine Co., Inc. —
Flexo Supply Co., The 833
Foxboro Co., The —
French Oil Mill Machinery Co., The 829

G

Gale, C. J. 839
Gammeter, W. F., Co., The 824
Gelb, R., & Sons, Inc. 837
General Atlas Division of Cabot Carbon Co. 749
General Latex & Chemical Corp. 821
General Magnesite & Magnesia Co. —
General Tire & Rubber Co., The 725, 831
Genseke Brothers ..... —
Gidley Research Institute .. 826
Glidden Co., The (Chemicals, Pigments, Metals Division) —
Goodrich, B. F., Chemical Co. (Hycar) 705
Goodyear Tire & Rubber Co., Inc., The (Chemical Division) 709, 711

H

Hadley Bros.—Uhl Co. 754
Hale & Kullgren, Inc. 713, 826
Hall, C. P., Co., The .. 716
Hardesty Chemical Division, W. C. Hardesty Co., Inc. 714
Harwick Standard Chemical Co. 719
Heveatex Corp. ..... —
Hoggson & Pettis Mfg. Co., The 810
Holliston Mills, Inc., The —
Holmes, Stanley H., Co. .. 756
Home Rubber Co. 831
Howe Machinery Co., Inc. 826
Huber, J. M., Corp. 758

I

Independent Die & Supply Co. 824
Indoil Chemical Co. ..... —
Industrial Ovens, Inc. .. 824
Injection Molders Supply Co. 827
Institution of the Rubber Industry ..... —
Interstate Welding Service —

J

Johnson Corp., The ..... —

K

K. B. C. Industries, Inc. .. 839

L

Lambert, E. P., Co. ..... —

M

Maimim, H., Co., Inc. 822
Marbon Corp. 817
Marine Magnesium Products Division of Merck & Co., Inc. 829
Martin Rubber Co. 839
Monsanto Chemical Co. .. —
Morris, T. W., Trimming Machines 744
Muehlstein, H., & Co., Inc. 797

N

National Rubber Machinery Co. 729
National Sherardizing & Machine Co., The .. 826
National Standard Co., The 728
Naugatuck Chemical Division of U. S. Rubber Co. 707, 751
Neville Co., The 743
New Jersey Zinc Co., The 712

O

OPW Corp. 825
Oakes, E. T., Corp., The 733
Oronite Chemical Co. .... —

P

Pan American Chemicals, Division Pan American Refining Corp. 819
Paterson Parchment Paper Co. ..... —
Pennsylvania Industrial Chemical Corp. 807
Pequanoc Rubber Co. 718, 839
Phillips Chemical Co. 706, 806, 818, 829
Pike, S. J., & Co., Inc. .. 742
Pittsburgh Coke & Chemical Co. 747

R

Rand Rubber Co. ..... —
Rare Metal Products Co. .. 818
Richardson, Sid, Carbon Co. 842
Rotex Rubber Co., Inc. .. 833
Royle, John, & Sons 748
Rubber Corp. of America .. 833
Rubber Regenerating Co., Ltd., The 805

S

St. Joseph Lead Co. .. .. —
Saniseal Mfg. Co., The .. 839
Schulman, A., Inc. Inside Back Cover
Scott Testers, Inc. 720
Sharples Chemicals Inc. .. —
Shaw, Francis, & Co., Ltd. 710
Shell Oil Co. 741
Shore Instrument & Manufacturing Co., Inc., The 837
Skelly Oil Co. 724
Snell, Foster D., Inc. 826
Southeastern Clay Co. 827
Southern Clays, Inc. .. —
Spadone Machine Co., Inc. 810
Stamford Rubber Supply Co., The 748
Standard Machinery Co., The 752
Stauffer Chemical Co. 708
Sun Oil Co. 799

T

Tanney-Costello, Inc. 746
Taylor Instrument Cos. 809
Taylor Stiles & Co. 750
Thomaston Mills 823
Timken Roller Bearing Co., The 801
Titanium Pigment Corp. .. 732
Tumpeer Chemical Co. .... —
Turner Halsey Co. 753

U

Union Carbide & Carbon Corp., Carbide & Carbon Chemicals Co. ..... —
United Carbon Co., Inc., Insert 721, 722
United Engineering & Foundry Co. ..... —
United Rubber Machinery Exchange 837
U. S. Rubbert Reclaiming Co., Inc. ..... —

V

Vanderbilt, R. T., Co., Inc. 760
Velsicol Corp. 815

W

Wade, Levi C., Co. ..... —
Wellington Sears Co. 740
White, J. J., Products Co. —
Whittaker, Clark & Daniels, Inc. 812
Williams, C. K., & Co., Inc. 738
Wilson, Charles T., Co., Inc. 825
Witco Chemical Co. 803
Woloch, George, Co., Inc. —
Wood, R. D., Co. 755

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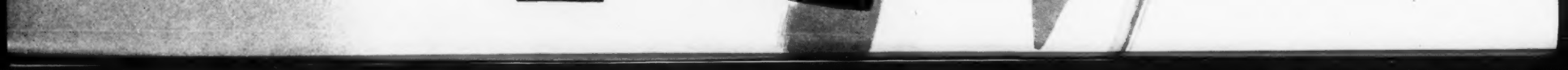

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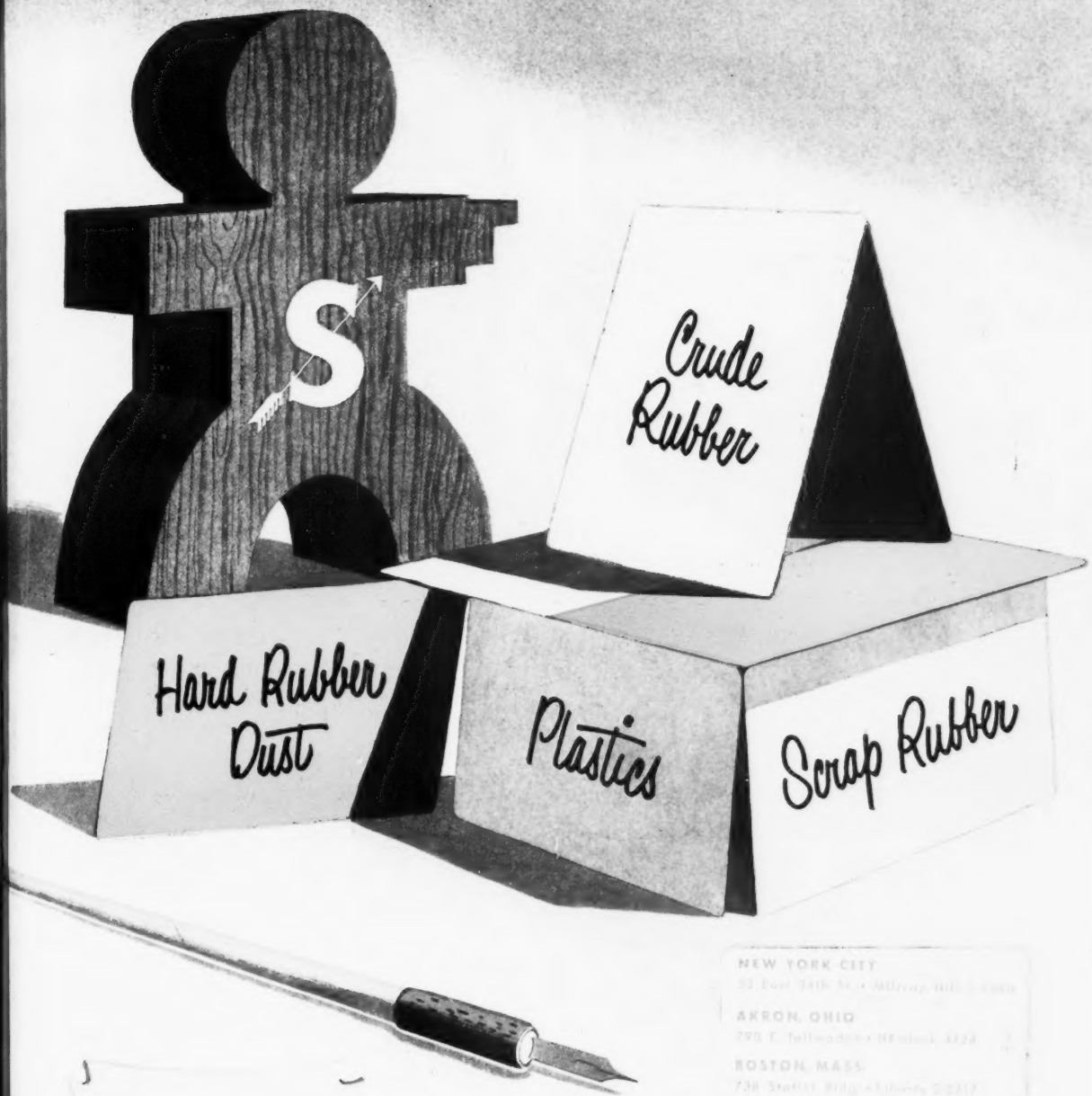

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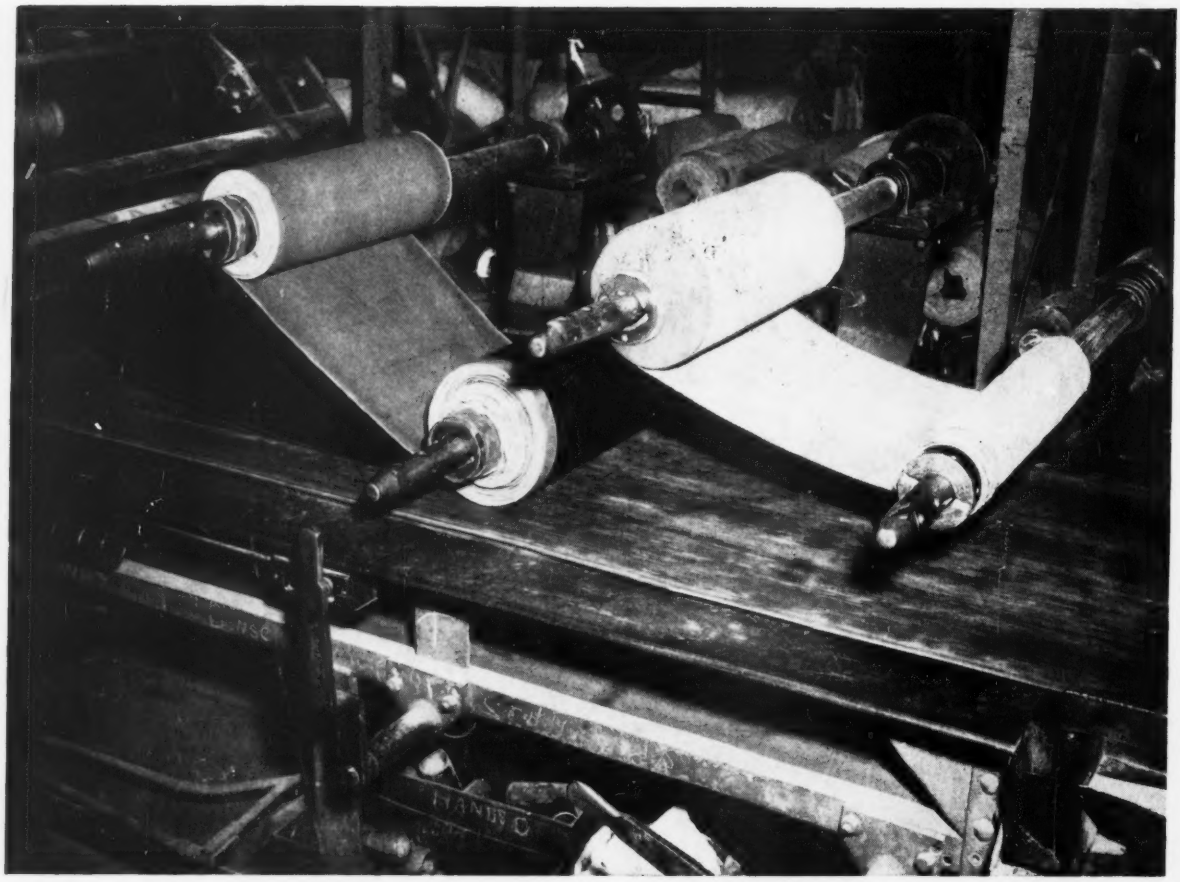

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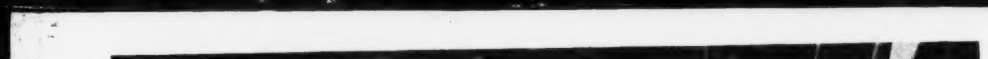
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